THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE— JUNE, 1948

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APPLICATIONS

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Machinery

From pulping to paper coatings, Patterson Equipment aids profits by better operating efficiency and long, trouble-free life. Write!

Robert L. Cumming

The Patterson Foundry and Machine Company
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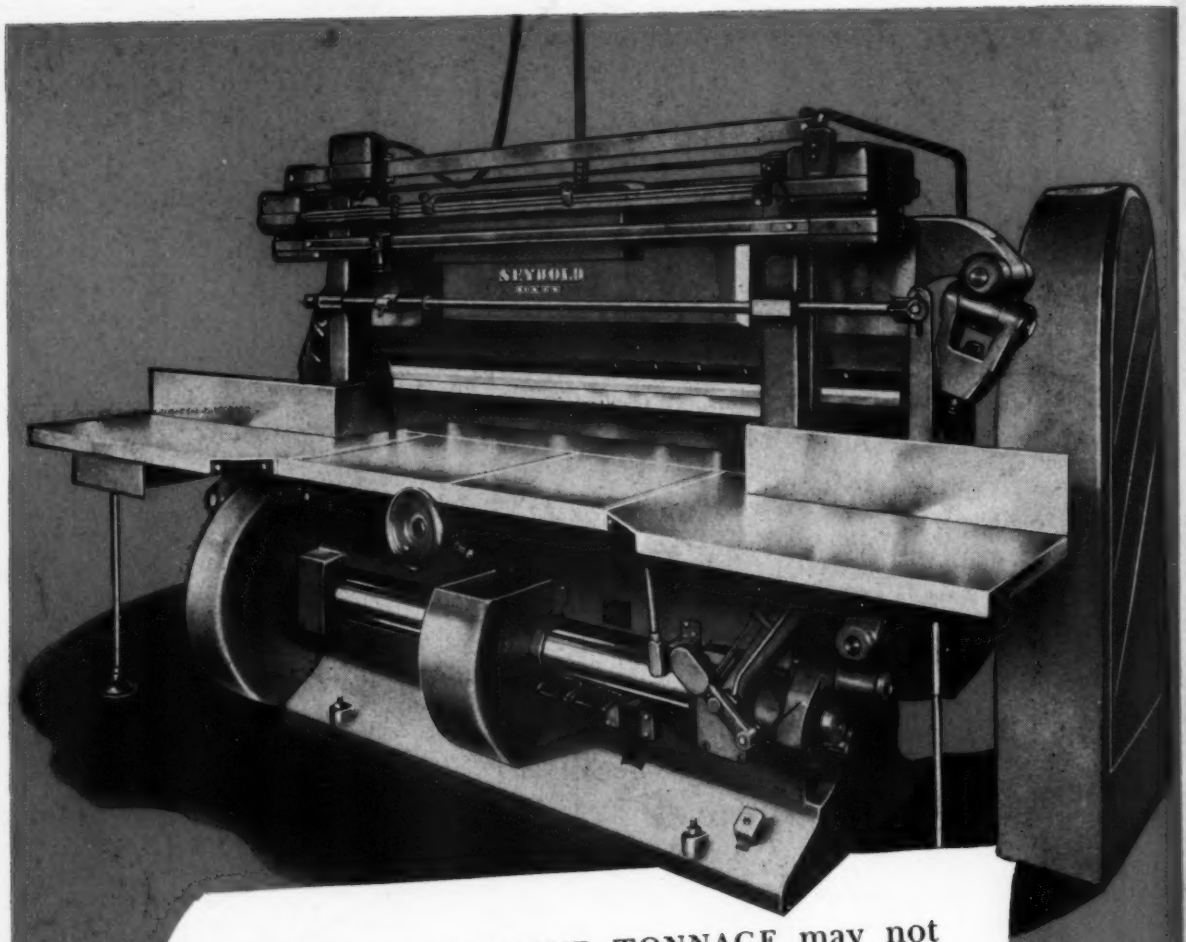

INCREASED MACHINE TONNAGE may not necessarily mean that you must increase the number of trimmers in your finishing room to keep production in balance. Some mills are learning this: *With new Seybold "Sixty" Spacer-Trimmers on the job, actually fewer trimmers are needed to handle more work! And valuable floor space is saved, too.* It will pay you to investigate production records being established by Seybold "Sixty" Mill Spacer-Trimmers.

HARRIS-SEYBOLD

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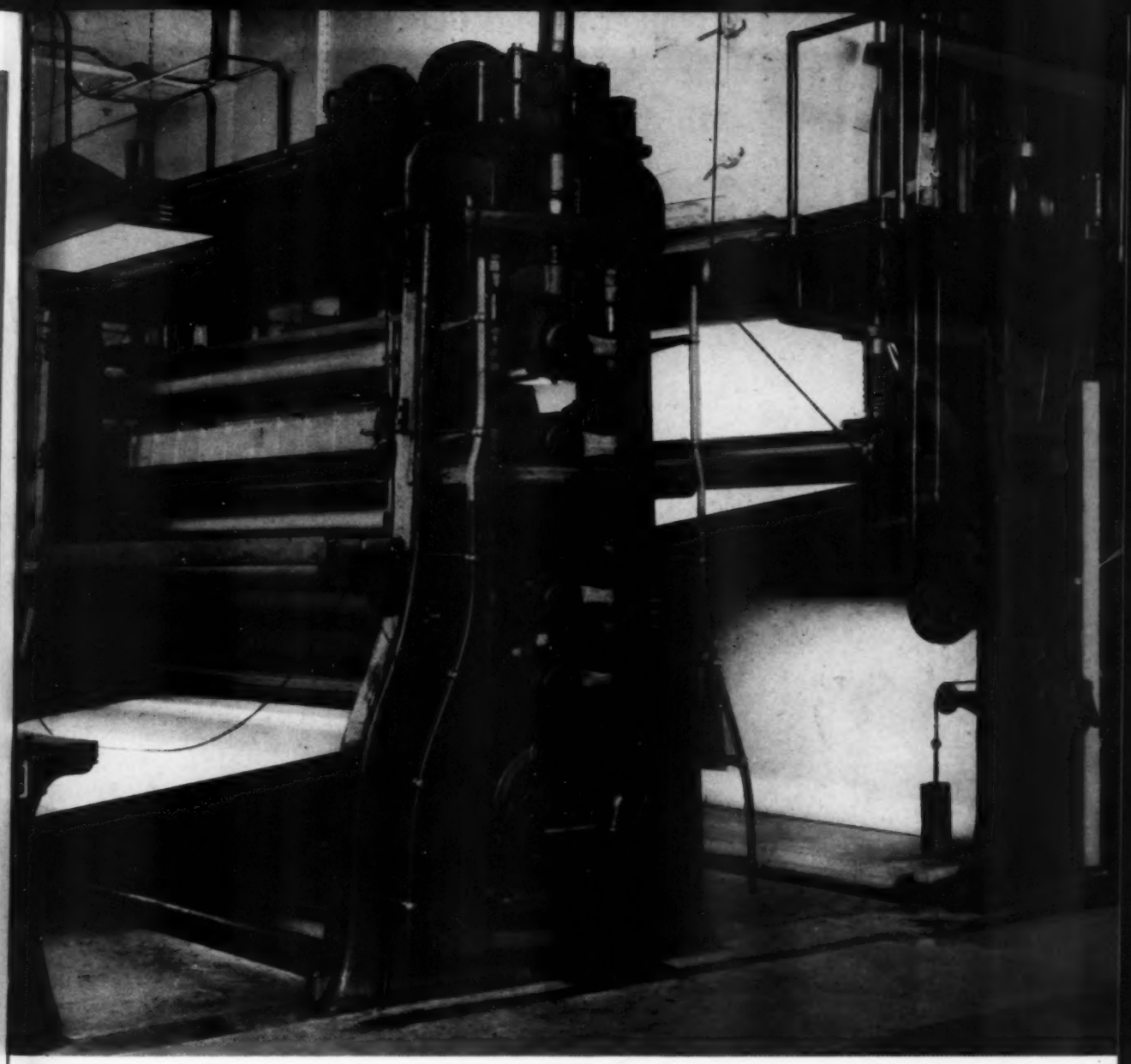
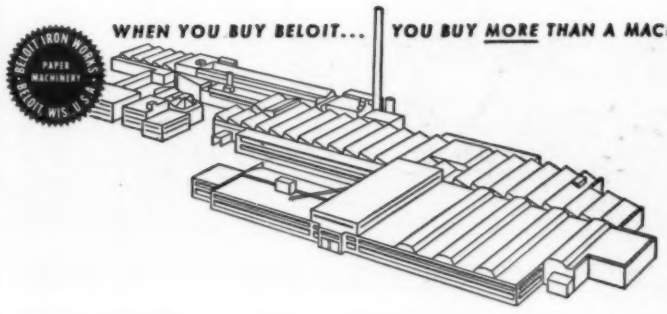


Sturdy, compact, efficient

Sturdy box-frame calender stacks like this are seen in many mills—dependable performers running efficiently on a variety of grades. Unit includes special Beloit features: anti-friction thrust bearings, babbitted bronze liners for easy changing, motor operated lift, bearings adaptable to continuous oiling, and other advantages of modern design. Air loading available if desired.—*Beloit Iron Works, Beloit, Wis.*



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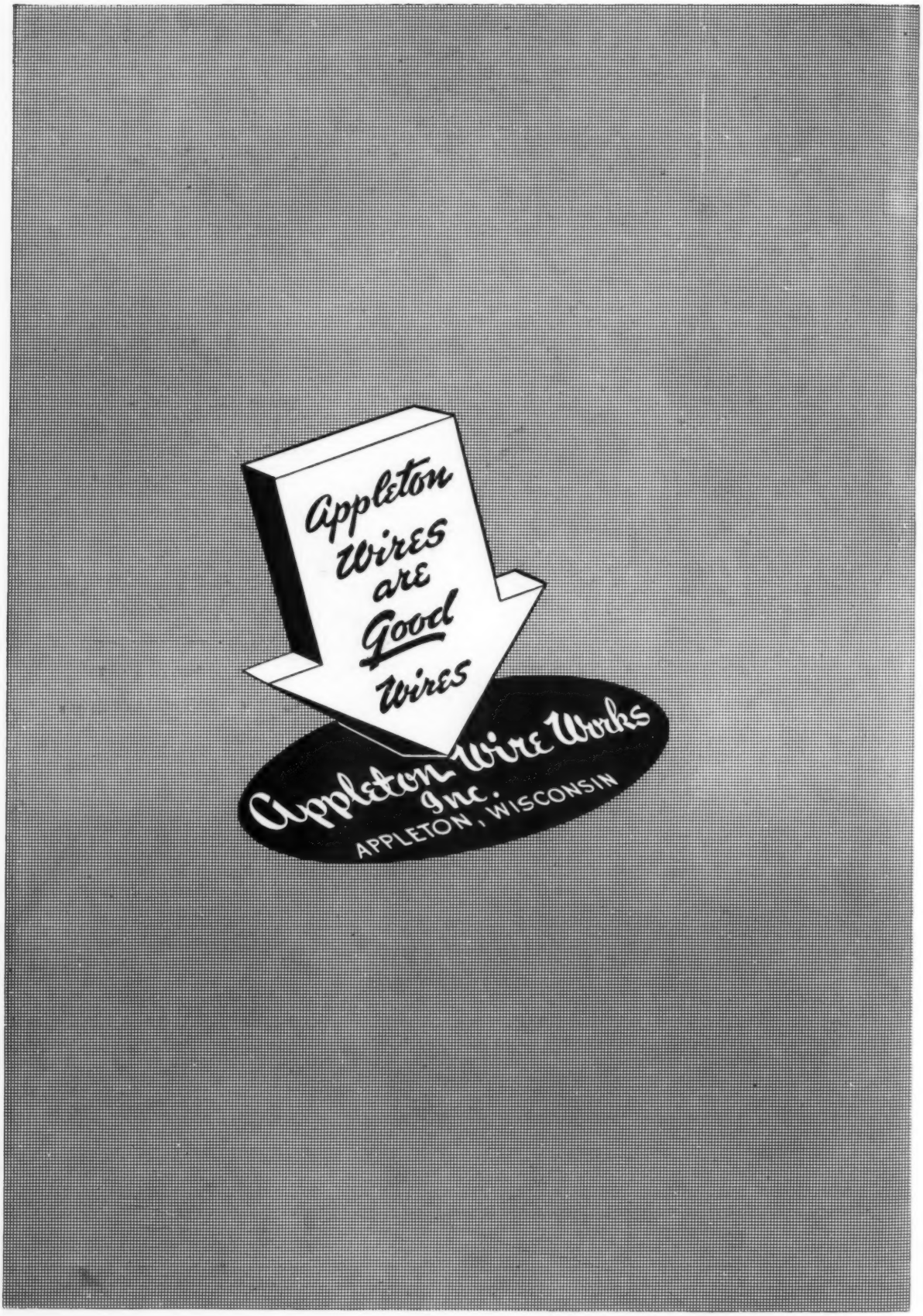
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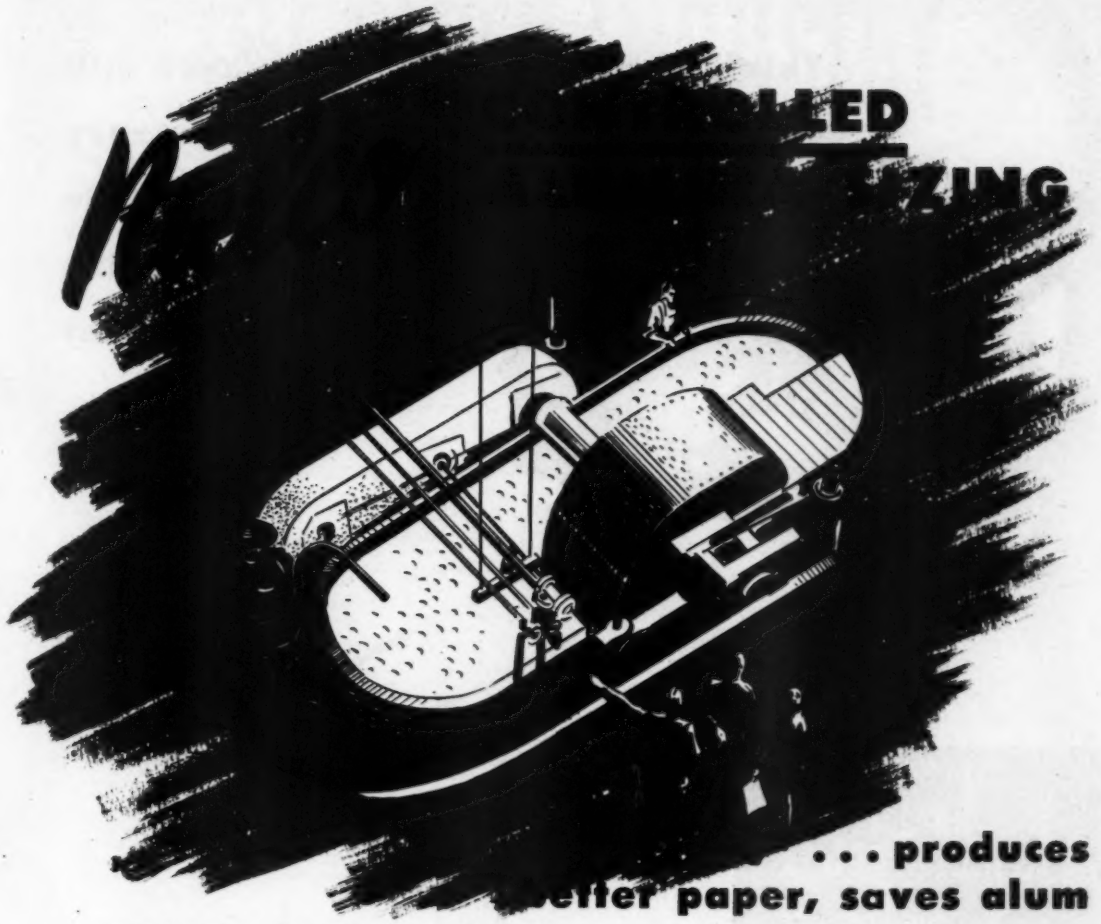


. . . produces better paper, saves alum

With the Nalco Controlled Alumina Sizing Method You Get These Advantages!

You Get Better Paper

1. In many cases, less alumina goes into the sheet, eliminating rattle and brittleness. 2. The paper is less acid and hence has a longer life.

You Conserve Alumina

It's not lost with the water that is discarded or lost from the system.

You Conserve Pulp

There is a higher retention of fibers in the sheet.

You Protect and Conserve Equipment

Lower acidity lessens corrosive attack on expensive copper, copper alloy wires and other metals.

Nalco

THE use of alum alone to produce alumina in sizing paper can be extremely wasteful as well as detrimental to the quality of the paper being made. When large dosages of alum are required, the pH of the solution in the beater is lowered to such an extent that the rosin size and the alumina fail to react completely and acidity is too high for good paper. In addition, when the water is discarded, an important quantity of alumina is lost.

This loss can be overcome through the use of Nalco Sodium Aluminate, an alkaline substance, which will produce 3 times as much alumina per pound as is contained in alum. By applying alum and Sodium Aluminate in varying proportions, any pH required for best results can be maintained. Less alum is required and the reaction of the alumina is more complete, permitting practically no waste.

For a complete discussion of this subject, write to Nalco.

Sodium Aluminate = Alum . . . Alum . . . Alum

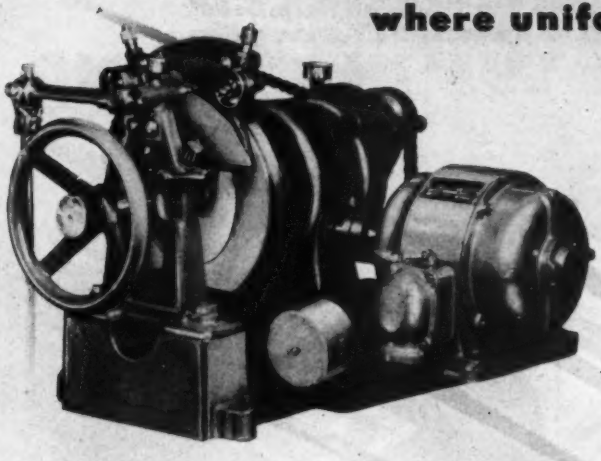
1 LB. OF NALCO SODIUM ALUMINATE WILL PROVIDE ALUMINA EQUIVALENT TO THAT OF 3 LBS. OF ALUM.

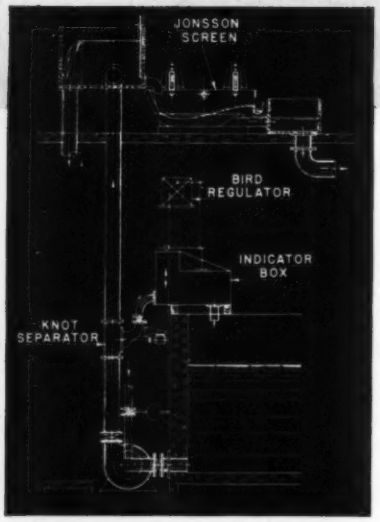
NATIONAL ALUMINATE CORPORATION

6232 West 66th Place, Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited, 555 Eastern Ave., Toronto 8, Ontario

Think of all the places in *Your* mill where uniform stock consistency would result in better operation at lower cost





AT THE KNOTTERS, FOR EXAMPLE

Here's one of the many useful and profitable applications of the Bird Consistency Regulator—at a Jonsson Screen to assure maximum efficiency of the knotting and pulp screening operations.

Now, with the Bird Consistency Regulator, there's no longer any excuse for operating with wrong or fluctuating consistencies anywhere along the line—at machine chests, stock chests, Jordans, knotters, brown stock washers, deckers, or wherever.

The Bird Regulator handles all kinds of stock, free or slow. It maintains consistency at whatever is desired, whether less than 1% or as high as 12%. Variations never exceed 0.1% heavier or lighter than desired. You just set it and forget it.

There are lots of places in your mill where this Regulator will pay for itself over and over. Better look into it.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

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On November 29, 1945, the Downingtown Manufacturing Company signed a contract with the United States Gypsum Company. For over a year, the United States Gypsum Company had analyzed its requirements for paper and felt, together with various designs and locations of mills and as a result of this study, they decided to install combination mills in California and New Jersey.

We would design and build two High Capacity, Combination Felt and Liner Board Machines and furnish all of the Stock Preparation Equipment for the two complete mills. They would be responsible for the power plant, buildings and accessories.

This was "Contract Unique" in the paper industry because of its size... and because of its scope... complete manufacturing equipment from raw material to finished product in two mills. It was "Contract Unique" in responsibility.

We and our sub-contractors delivered this equipment on schedule, despite the harassing strikes in steel, coal, copper and numerous other industries, under the able leadership of our former president, Edward T. Street.

Enright A. Ellis

President,
Downingtown Manufacturing Company

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CONTRACT UNIQUE

It's the biggest and the most unusual in the annals of the paper manufacturing industry. . . . Biggest in size and in the amount of machinery involved and in responsibility. . . . 182 Freight Carloads carrying 3948 Tons of Equipment, delivered on schedule, despite many strikes. . . . 2950 Tons of Cast Iron, 105 Tons of Brass, Bronze and Copper, 73 Tons of Stainless Steel, 37 Tons of Rubber, etc., etc., used. All this and more is "Contract Unique."

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Permanent LININGS FOR TANK CARS

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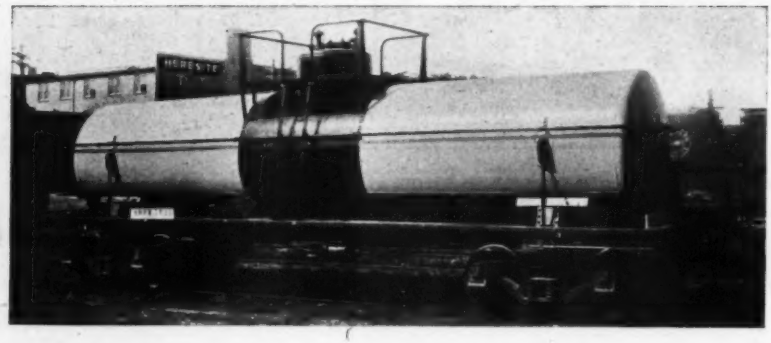

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Heresite linings effectively prevent product contamination of such items as concentrated Sulphuric Acid, Rubber Latex, Formaldehyde, Lactic Acid, Battery Acid, Acetic Acid, Vinegar, Fruit Juices, and Wine. Tank cars lined 5 years ago are still in daily service.

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These tank cars are quickly cleaned by Steaming, Hot Water or any type of Solvent.

SYNTHETIC RUBBER LINING

A recently perfected rubber lining will adequately transport caustic ingredients such as crystalline Sodium Hydroxide.

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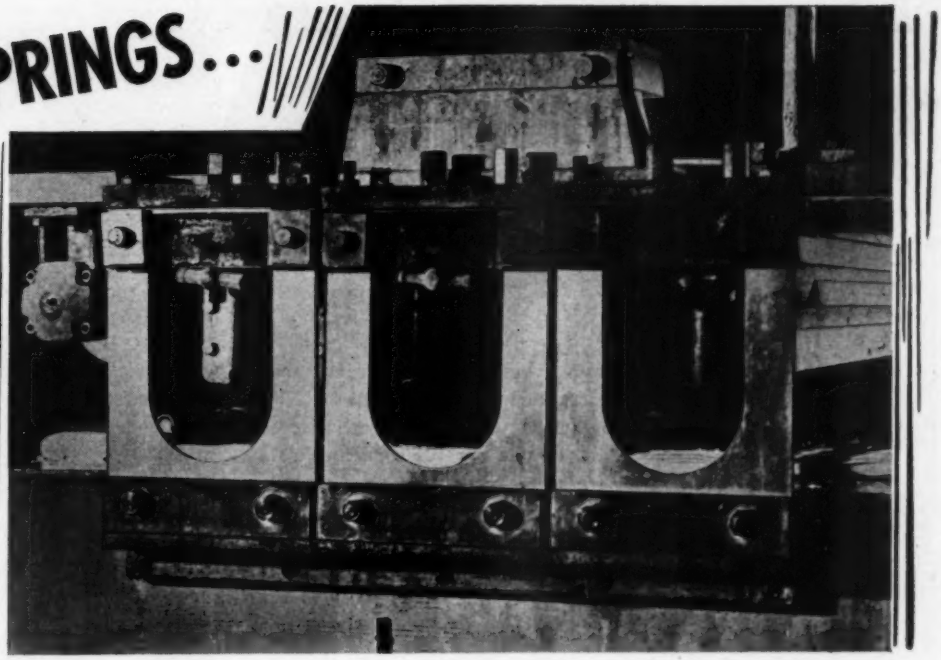
SHAKE SPRINGS...



How long do you figure they ought to last?

Look over these new springs, built of "Z" Nickel by Rice Barton Corporation, Worcester, Mass. Before you make your estimate read the facts below:

You know that suction box shake and support springs have to take a lot of punishment. No need to tell you that these springs must resist corrosion and possess high mechanical strength.

Now look again at the installation above. The springs are assembled in leaf fashion from sheets 1/16" thick. They are full heat-treated "Z"* Nickel, with hardness of 38-40 Rockwell C and tensile strength close to 200,000 psi.

You surely know that Nickel provides high resistance to corrosion and absolute freedom from rust and from moisture absorption.

These "Z" Nickel shake springs are standard on many Rice-Barton fourdriniers. And how long are those springs likely to last? Maybe you can judge from this fact:

"Z" Nickel shake springs of similar design have been in continuous service on one high speed machine since 1939. That's going on ten years. Ten years without failure due to rust, corrosion or spring fatigue. How many more years do you figure they will continue in service?

Want detailed engineering facts on the complete range of "Z" Nickel mechanical properties? Write, please, to

*Reg. U. S. Pat. Off.

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On many jobs, either Low or High Lift power trucks are better suited than fork trucks. Their lighter weight is advantageous where floor or elevator capacities are limited, and they are lower priced than comparable fork models. Low or High Lift Trucks are not as heavy because the load is *over* the wheelbase—fork trucks must be counterweighed, usually with lead.

High Lift Trucks can have forks substituted for platforms for palletization.

Your near-by man will offer *unbiased* advice about the proper type of truck for your needs, because Elwell-Parker produces *ALL* types—fork, low lift, high lift, cranes and tractors. The Elwell-Parker Electric Company, 4241 St. Clair Avenue, Cleveland 14, Ohio.

FREE BOOKLET

describes scientific materials handling—ask for "Industrial Logistics".

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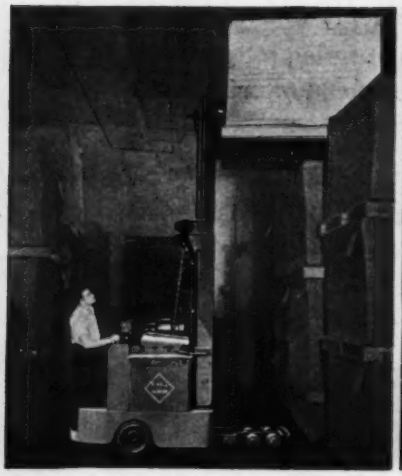
Established 1893



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NEWS

A. O. SMITH Corporation

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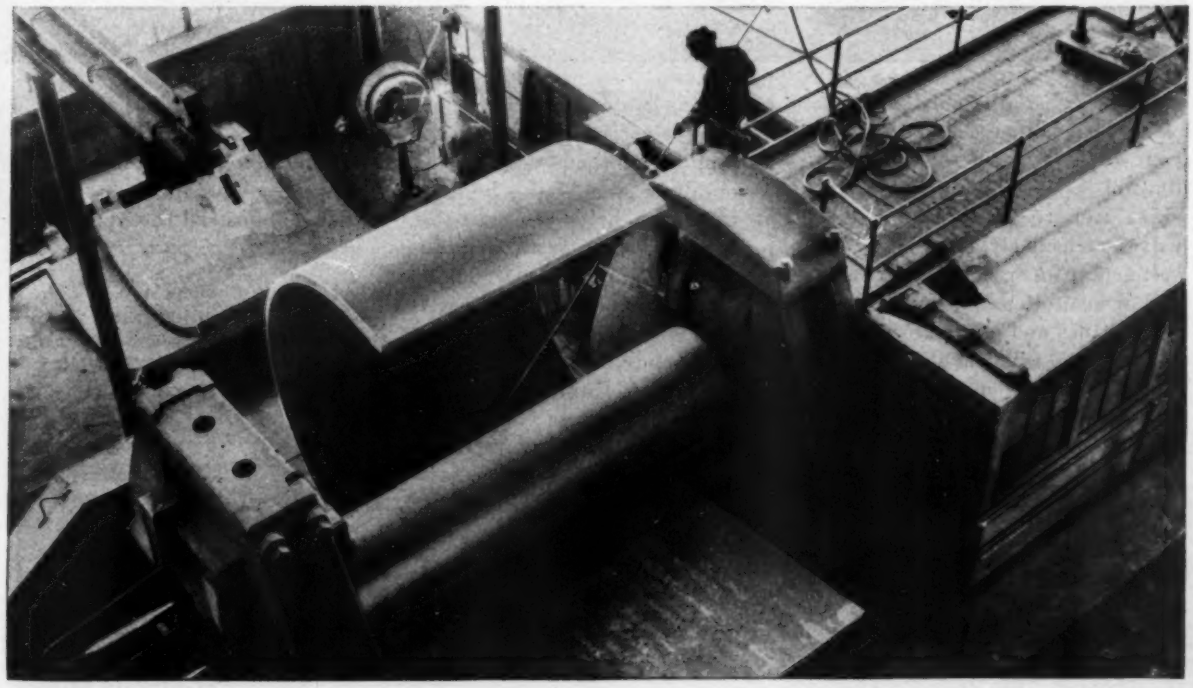
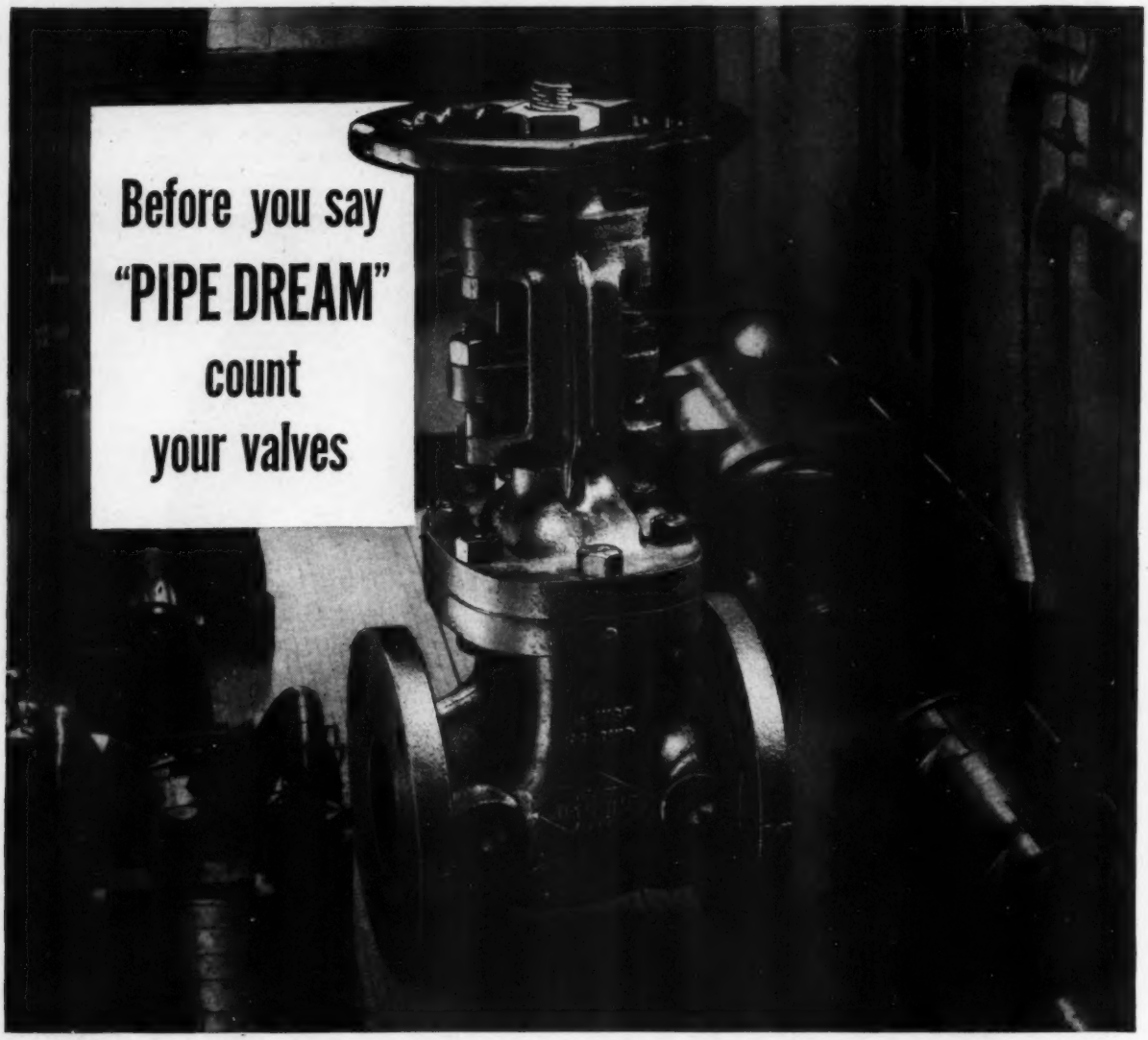
PACKAGED DELIVERY. The 15-ft. diameter of this SMITHway paper digester made rail shipment impractical. The SMITHway was to pack the vessel in sections, field-assemble it on the site.

TAILOR IN STEEL. Since 1923 Jacob Strand has machined the parts of hundreds of SMITHway Vessels which are now in service all over the world.

HEAVYWEIGHT CHAMPS? Frankly, we don't know. But these particular heavy rolls come in handy when 8,000,000 lb. of pull-down are needed to shape heavy steel plates.





THINK OF *all* the valves in this power plant as *one* valve, and your mind's eye will see something like this photo-illusion. It emphasizes an important fact—that valves, collectively, are a major investment in *any* plant, *any* commercial or institutional building.

WITH WAGES and material costs the highest ever, it is just as important for alert management to keep a sharp eye on valve maintenance costs as it is to watch operating expense of larger plant units.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets. JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

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Types, Sizes, Pressures, Metals for Every Need

Somebody's going to hear about this!

The customer's holding the bag right now—but not for long. Some paper maker is going to lose business because the bag wasn't *wet-strengthened* with UFORMITES.

In all kinds of paper products where wet strength counts—count on UFORMITES. As little as 1% resin solids on dry fibre weight boosts wet tensile strength as much as 300%—increases wet rub and scuff resistance—improves dry tensile, Mullen, fold, uniformity of sizing and coating surface characteristics.

There's no pretreatment, special processing or new equipment needed. For Kraft stocks, merely add UFORMITE 467 to the beater—just as you would a rosin size. For sulfite, rag, groundwood—where low acidity is essential—add UFORMITE 470 anywhere at the wet end of the machine. Both UFORMITES are infinitely dilutible with water,—well suited to use at low concentrations usually employed in paper stock systems.

Whether you manufacture bags, wrapping paper, toweling, soft tissues, glassine, map, chart or ledger paper, UFORMITES can increase the value of your product. Write today for full details and samples of these urea formaldehyde resins.

Handy Facts on Wet Strength

Your copy of this free booklet will answer your technical questions about how the UFORMITES are used to increase wet strength. Write today.

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"EVERYTHING FOR THE PAPER MILL"—and on that we take our stand.

Because *"Everything for the Paper Mill"* is not just a slogan or trite assembly of high-sounding words, but susceptible of definite proof, the mills should be interested.

The mills should be interested because the ability to engineer and build so varied a line of preparation, forming and converting equipment implies very broad experience in mill problems—***75 YEARS' EXPERIENCE,*** to be exact. That experience can and often does prove invaluable, regardless of speeds, tonnages, grades or physical mill layouts.

They should be interested because the supplier who thoroughly understands both preparation and forming has a better opportunity to see the mill's requirements as a whole and engineer the program accordingly. Believe us, gentlemen, there is more to this than meets the naked eye.

Finally, mills should be interested in the ability of Black-Clawson to engineer and build "Everything for the Paper Mill" because, when you commission such a supplier to engineer and build your mill, you center all responsibility for its smooth and efficient operation at one point. That, too, can be extremely important.

THE BLACK-CLAWSON COMPANY, Hamilton, Ohio

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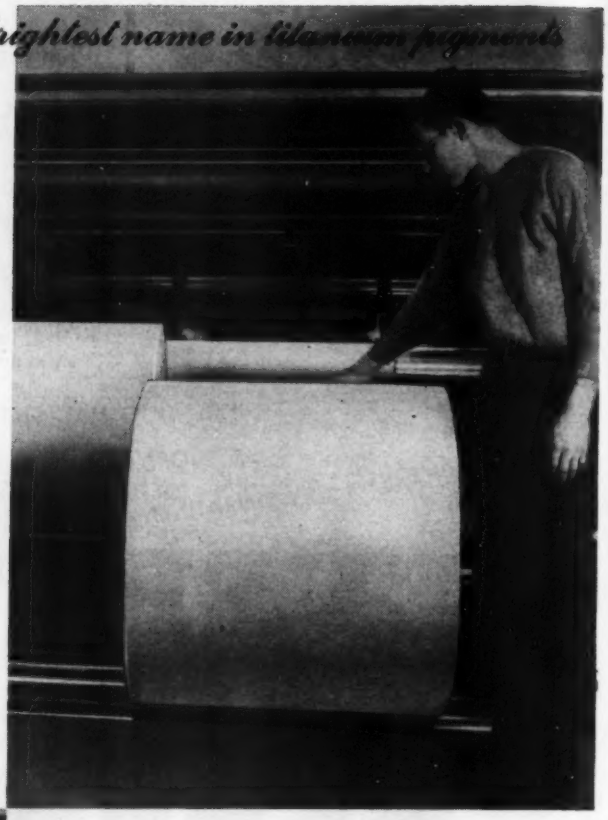
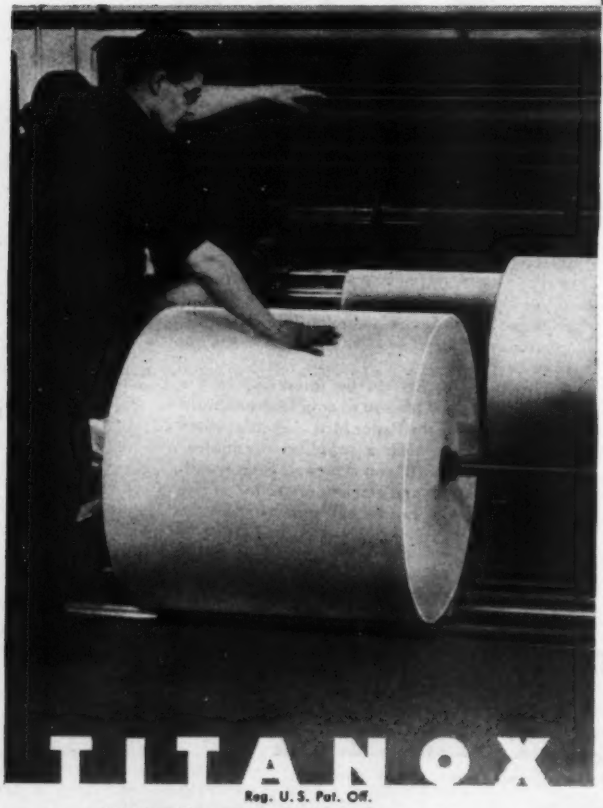
there's better printability in paper containing

Titanox pigments





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● ● ● because they impart the desired degrees of opacity, whiteness and brightness. Employed in lighter weight papers, these titanium dioxide pigments help banish "show-through". In heavier and packaging stocks they contribute whiteness and enhance the "sell-ability" of the product.

Our Technical Service Laboratory will be happy to render assistance on any problem which you may have regarding the use of TITANOX pigments to the best advantage. You can communicate with the Laboratory through our nearest office.

6440

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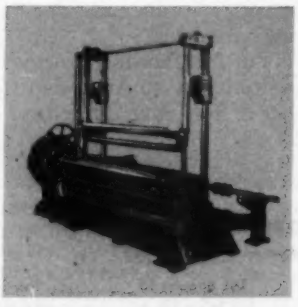
Rolls made on Langston Slitters and Roll Winders are *solid*—tightly wound from core to maximum diameter. You get *clean-cut* rolls, square edged and of uniform density—from any weight or grade of paper or board. There's a type and size for every need.

Samuel M. Langston Company, Camden, New Jersey.



Langston

SLITTERS AND ROLL WINDERS

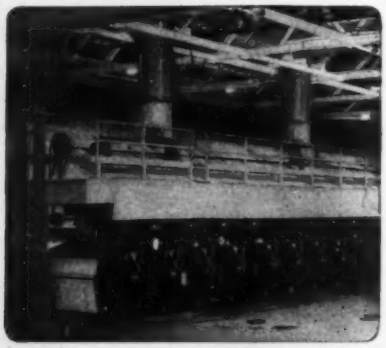
6 common applications

where *WOLMANIZED PRESSURE TREATED LUMBER

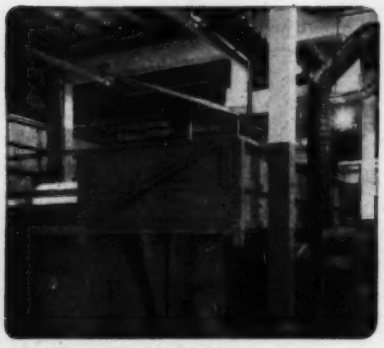
protects against DECAY and TERMITES

1. Ground moisture and rain held in joints, etc., of outdoor structures.

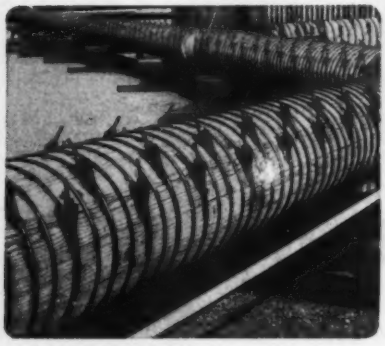
2. Roof decks subject to rapid decay caused by excessive humidity.



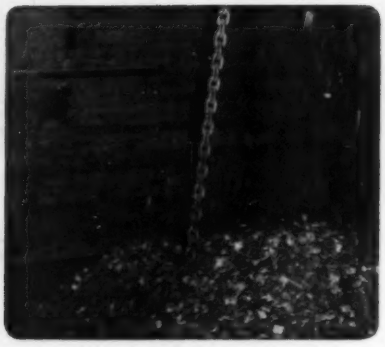
3. Where steam and vapor from industrial processes are prevalent.



4. Mixing tanks and equipment exposed to water contact.



5. Where combinations of outdoor exposure and water contact are present.



6. Walls and floors of bins subject to decay caused by moisture condensation.

LASTS FOR DECADES

Imagine the saving in maintenance which you could realize by using lumber which is protected against wood-decay and termites. "Wolmanized" pressure-treated lumber offers just such protection—lasts 3 to 5 times as long as ordinary wood.

Actual service records prove it. Best of all, the extra cost of this pressure-treated lumber is less than the cost of labor alone in replacing prematurely failing, untreated wood.

Learn more about this money saving pressure-treated lumber.

Get all the facts and figures on how Wolmanized pressure treated lumber resists decay and termites.

Write today for this new booklet.

Wolmanized lumber is pressure-treated with salts which are toxic to decay fungi and termites. The treated wood is clean, odorless, paintable and non-corrosive to metals. For lower maintenance costs—sounder buildings—investigate the advantages of using Wolmanized lumber in your building program.

For full factual information, write today to American Lumber & Treating Company.

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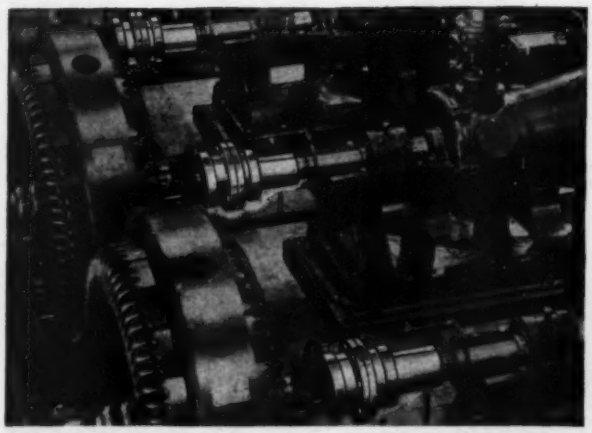
How to Get

Uninterrupted Power Transmission for All Paper Mill Drives!

SPECIFYING Fast's self-aligning Couplings is the answer! No matter what your coupling problem, there's a Fast's made to solve it . . . and give you longer machine life, lower upkeep costs and minimum shut-down losses. For absolute dependability, these *original* gear-type couplings are built with many important features . . . such as an *exclusive* "rocking bearing."

This bearing is *exclusive* in providing a positive metal-to-metal seal against wear-producing moisture, dust and grit. The bearing is also exclusive in its correctly engineered position which allows *freedom of movement* to compensate for misalignment because its *spherical* base has *the same axis* as the hub spline faces. And as a plus, Fast's Couplings give you the benefits of years of top engineering experience, Koppers' high standard of workmanship and unexcelled coupling service which assures spare parts no matter how old your couplings may be. For full information, mail the coupon below to: Koppers Co., Inc., Fast's Coupling Dept., 236 Scott St., Baltimore 3, Md.



FOR JORDAN ADJUSTMENTS—Fast's Jordan-Type Couplings reduce wear on bearings, prolong life of motor and Jordan. Because the Fast's splines are meshed in oil, plug adjustment is smooth and certain. No worn spots can develop. The customary "hard spot" is eliminated. Due to smooth torque and elimination of coupling vibration, Jordan lining life is increased and the product discharged from the Jordan is uniform.

FOR STANDARD APPLICATIONS—Fast's Standard Couplings are designed for use on all ordinary installations. They are made in shaft sizes from 1½" to 5".

FOR REMOTE DRIVES—Fast's Floating Shaft Couplings enable drives to be set back from paper machines without the use of supporting bearings. This eliminates one piece of equipment—does away with the necessity of keeping three or more bearings in line—saves installation cost and eliminates upkeep, attention and replacement of bearings.

KOPPERS

FAST'S *self-aligning* COUPLINGS

SEND FOR FREE CATALOG!

Gentlemen: Please send me your illustrated, informative catalog, giving full information on the many types of Fast's Couplings.

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Company.....

Street.....

City.....Zone.....State.....

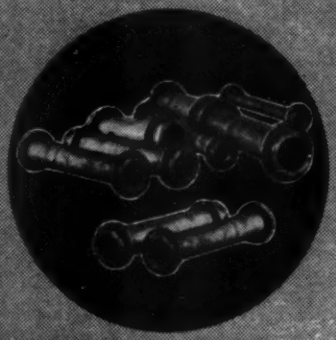
BEFORE and AFTER

••LODDING DOCTORS••

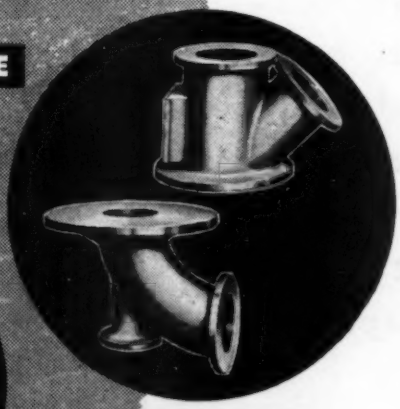
RESIST

CORROSION • ABRASION • HEAT *in the Paper Mill*

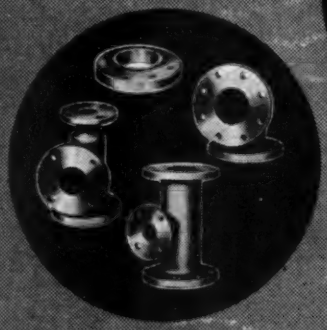
with COOPER STAINLESS STEEL...



CENTRIFUGAL PIPE



CASTINGS



FITTINGS

COOPER'S years of close association with the Paper Industry and its intimate knowledge of the problems peculiar to that industry . . . plus vast technical experience combined with practical shop skill has resulted in COOPER'S unusual ability to produce sound corrosion resisting Stainless Steel castings, fittings, and centrifugal pipe specifically designed to resist corrosion, abrasion and heat in the Paper Mill.

Each step in the production of COOPER Stainless Steel products is fully controlled . . . for all facilities and services at COOPER are located under one roof making The Cooper Alloy Foundry Co. the largest of its kind in the country.

Est. 1922

THE COOPER ALLOY FOUNDRY CO.

HILLSIDE, NEW JERSEY

Specialists in Corrosion Resisting Stainless Steel . . . for a Quarter of a Century

Kalamazoo Glazed Tile TANKS and CHESTS

Why experiment in tank construction when this proved, practical and dependable type of construction is now available?

The material that is enduring, clean and adaptable to any size or shape.

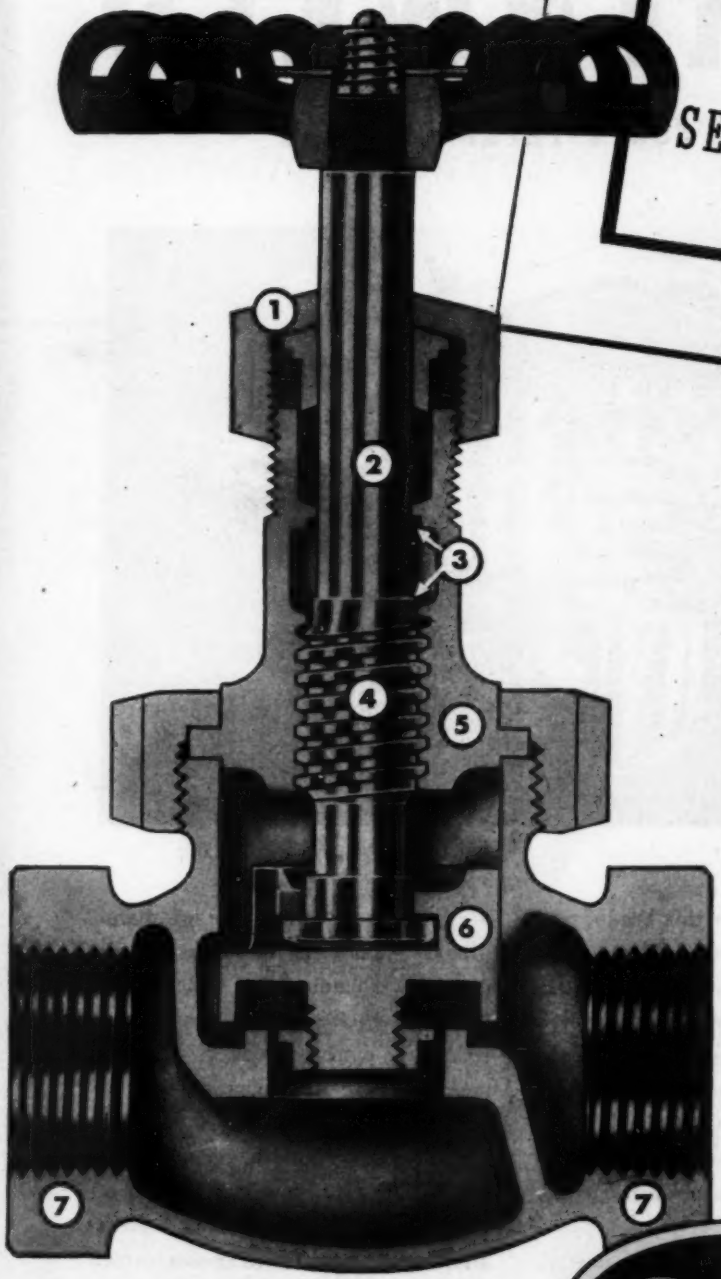
Consult Kalamazoo engineers for planning any type of tank or chest.

KALAMAZOO TANK & SILO COMPANY

KALAMAZOO : MICHIGAN

COST REDUCING *extras...*

OIC SETS THE PACE IN VALVES



1 The extra large packing nut will stand a man-sized wrench and has sufficient threads to utilize all packing in the stuffing box.

2 Heavy, wear-resisting manganese bronze stem means longer wear with less maintenance.

3 Back seating, providing special seat surface on stem above threads, permits quick, easy repacking under pressure.

4 Large thread contact area withstands extraordinary strain and maintains tight closure.

5 Sturdy bronze bonnet, union type construction, assures a tight bonnet joint and permits quicker and easier inspection and servicing.

6 Slip-on type disc holder is designed especially to permit quick, easy replacement.

7 Heavier, better construction throughout the distortion-proof body provides maximum resistance to operating stresses. Full area water ways throughout. Adequate stock for repeated re-seating.

NO MORE CHANGE-OVER TROUBLES WITH THE HANDY OIC CROSS REFERENCE CHART
Just check the number of the valve that you wish to replace, look in the OIC Cross Reference Chart, and you will find the number of the OIC Valve to replace it. For your free copy, write to The Ohio Injector Company, Wadsworth, Ohio.

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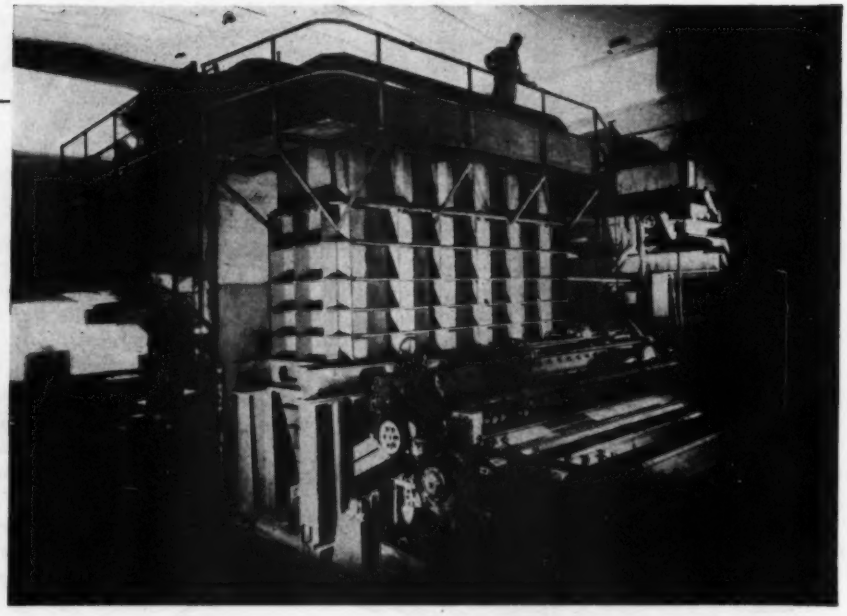
OIC VALVES

STEEL • IRON • BRONZE

Built by

LUKENWELD

FOR SCOTT PAPER COMPANY



This paper machine headbox, built of Lukens Stainless-Clad Steel, replaced another type of structure. It regulates the flow of pulp to a paper-making machine, according to the type of paper being made.

Flow lines needed in this headbox to distribute pulp properly for top-quality paper production were developed by Scott Paper Company. Then they asked Lukenweld, "Can you build us a headbox to these requirements?"

Lukens Stainless-Clad Steel, Type 304, was employed, providing *solid* corrosion-resistant metal protection with *clad* steel economy.

That's how Lukenweld likes to work —applying our knowledge of plate-product engineering to another man's problems. Planning the structure to meet his specifications, selecting materials for most economical performance, building it; Lukenweld service is that complete.

Have you a problem we can help solve? Write Lukenweld, Division of Lukens Steel Company, 408 Lukens Building, Coatesville, Pennsylvania.

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

THE American DIESELECTRIC

A Revolutionary New Locomotive Crane!

When you read that the American DIESELECTRIC pays for itself in five years, you have every right to be skeptical. Yet we ask only an opportunity to show you actual figures, based on long term job tests. Obviously, this locomotive crane is something new and *different*. It uses direct-diesel power for hoisting and slewing; electric power for traction. Want details? Mail the coupon below.

DIESEL-ELECTRIC LOCOMOTIVE CRANE. PATENT NO. 2083468. TOUCH CONTROL. PATENT NO. 2376856.

American Hoist
and DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: So. KEARNY, N. J.
Sales Offices: NEW YORK • CHICAGO
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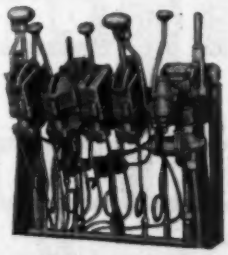
SAN FRANCISCO

Graduated AIR CONTROLS!

● With ordinary old-style air controls, any crane is subjected to continuous slams and bangs...a result of "snap" action clutches. In the DIESELECTRIC this action is graduated. Every motion of the crane—hoisting, slewing, live-boom action, travel, load pick-up and load release—can now be made in any desired degree at any desired speed, smoothly and precisely. Also, any or all motions can be simultaneous. Result: less fatigue, more work output.



AMERICAN HOIST
and DERRICK COMPANY
St. Paul 1, Minnesota

Please send Catalog 600-L-4, describing the American DIESELECTRIC Locomotive Crane.

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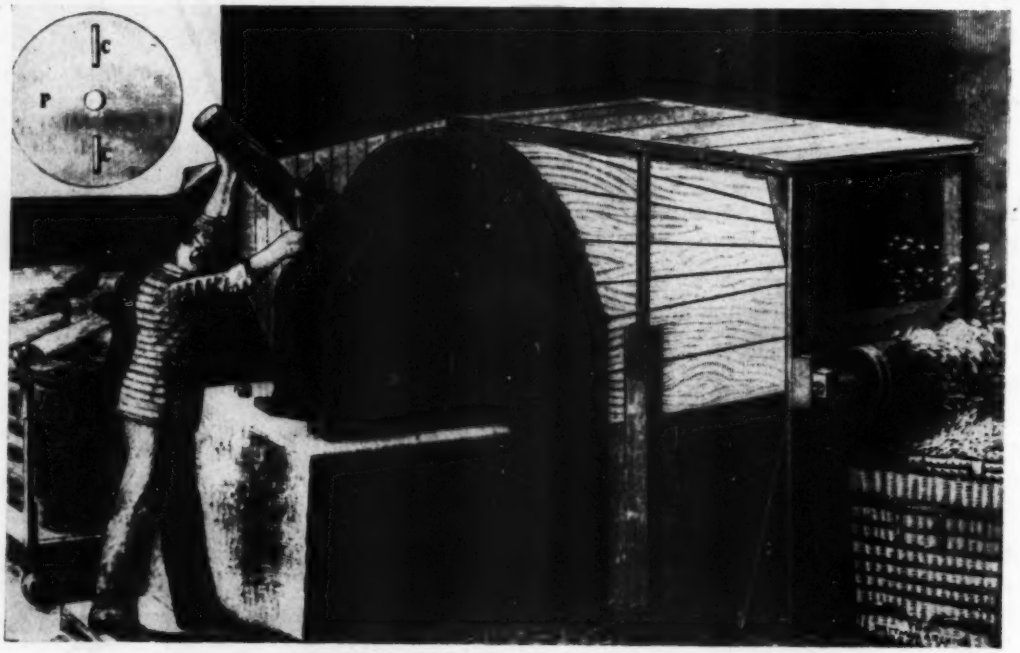
AS MASS PRODUCTION OF PAPER BEGAN IN THE EARLY *"Nineties"*



Paper making was an art as the early paper maker made one sheet at a time. Production was limited to the individual effort of the paper maker. As this art grew into an industry machines began to take the place of the individual. Sheets were produced by the paper maker, and tons were produced by machines. Mass production was born.

Even as the early paper maker used felts to make paper, placing felt layers between the sheets to remove the water, mass production of paper requires felts.

As the art grew into an industry felts developed with the industry always keeping pace with production methods. Since 1890 Appleton felts have kept pace with paper making; today they are preferred by mills everywhere.

This is one of a series depicting the early history of paper making.

APPLETON WOOLEN MILLS

APPLETON
WISCONSIN

Automatic

UNIFORM SPEED REEL

Without exception, operators using this Bagley and Sewall Reel maintain that it is the most convenient reel they have handled. As one roll builds up, the supporting bearings carry that roll away from its initial position so that another empty drum may be inserted . . . the operation is continuous.

This automatic uniform speed reel provides an instantaneous shift of the running sheet from the completed roll to the empty drum . . . with no loss of paper . . . and with smooth winding from the start. Tension is easily controlled, and spreader is effective and dependable.

See our sales engineers before ordering new paper making machinery. They understand mill requirements.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK

REDUCE SCREENING LOSSES AS MUCH AS 40% PER WEEK WITH CRODON PLATING

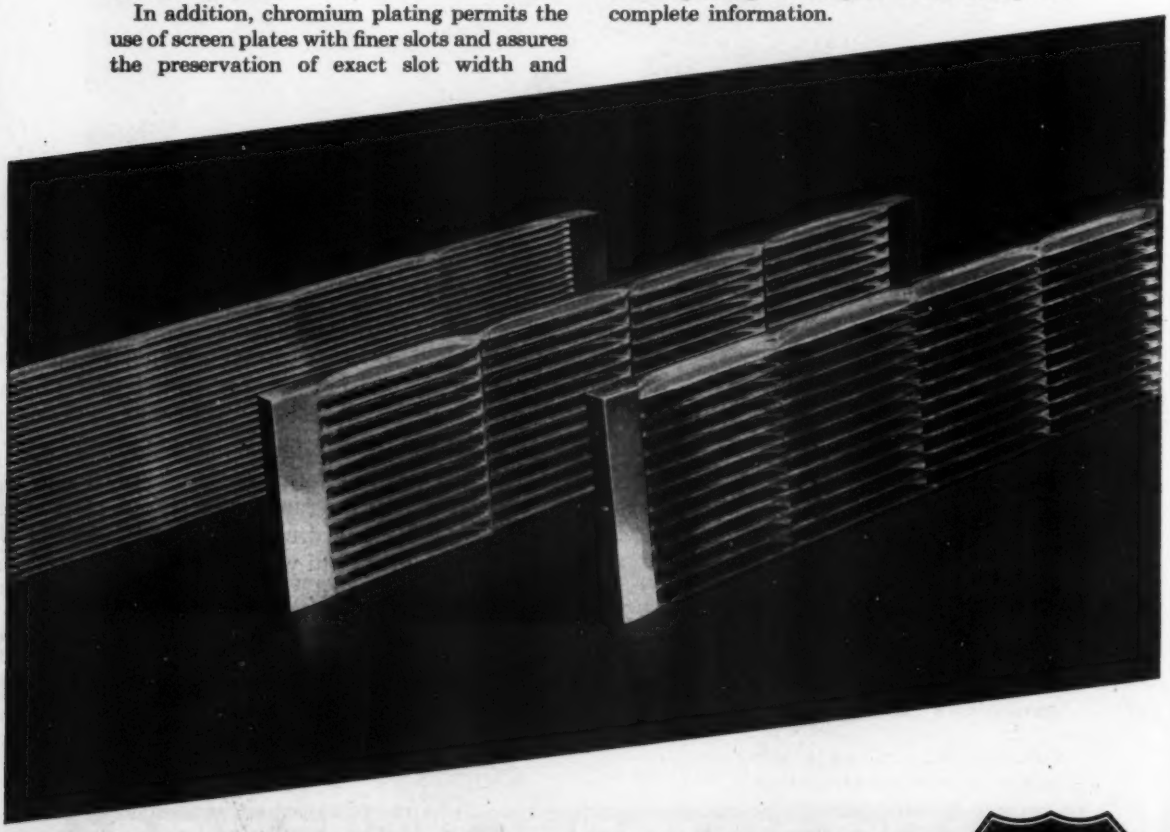
Take a *good* look at your screen plates. If you find them worn, rough and inaccurate... or with badly clogged slots causing heavy losses in screening capacity...you need the benefits of chromium plating.

The screen plates illustrated, for example, have been chromium plated and thus provided with a permanently hard, durable protection against wear and corrosion. The smooth, non-adherent properties of CRODON prevent the filling up or clogging of slots... known to cause losses in screening capacity as high as 40% in one week.

In addition, chromium plating permits the use of screen plates with finer slots and assures the preservation of exact slot width and smoothness. The results: greater production of a higher quality paper... fewer costly delays for cleaning or repairs.

NOW is the time to investigate how chromium plating can increase screening efficiency in your mill. One mill found that chromium-plated screen plates lasted four times as long as plain bronze plates.

By specifying CRODON when you chromium plate equipment, you are assured of the incorporation of all Chromium Corporation of America's skill and experience in electroplating technique. Write today for complete information.



CHROMIUM CORPORATION OF AMERICA

CRODON
The Chrome Plate

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If it's power piping equipment it's in the CRANE line

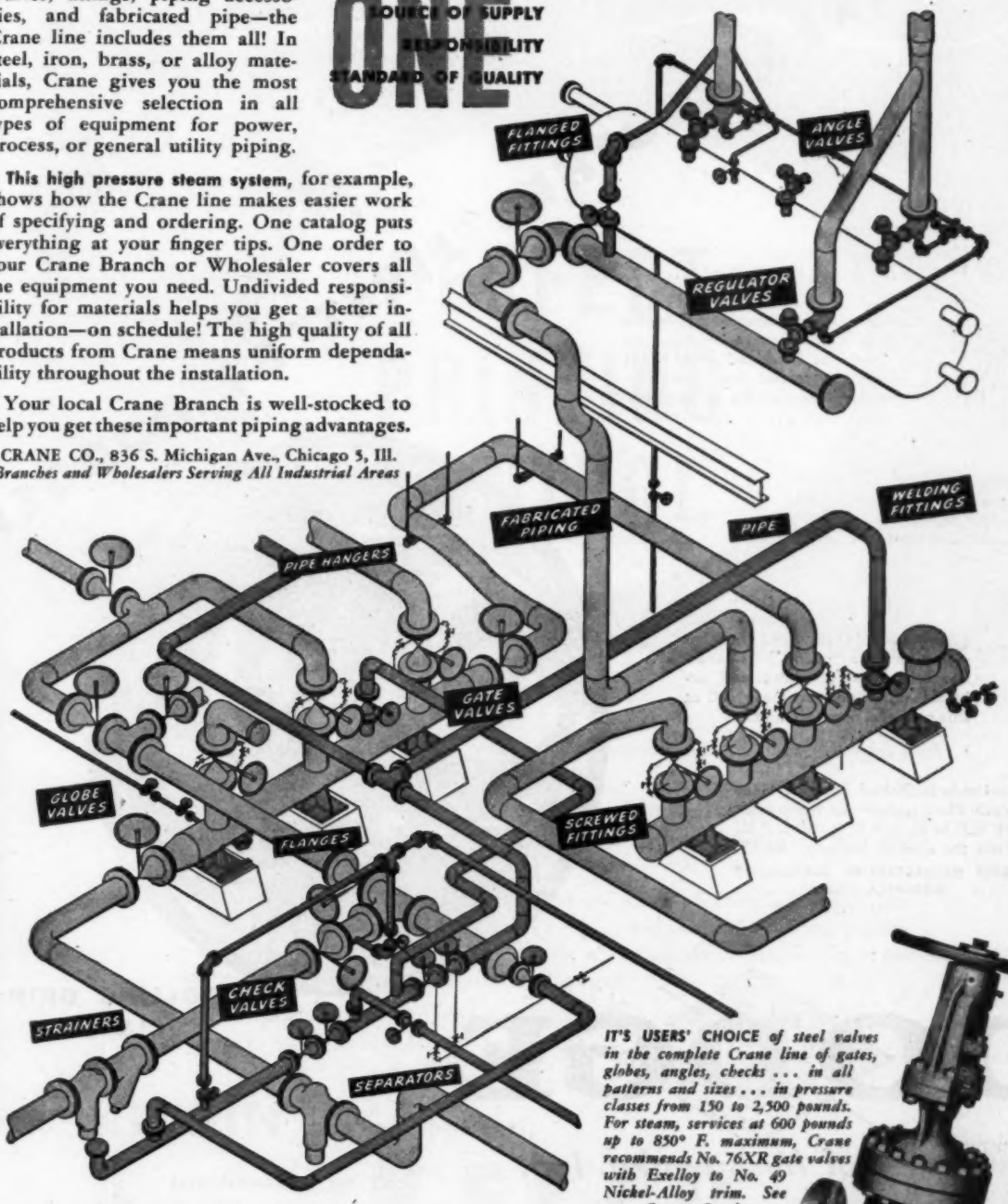
Valves, fittings, piping accessories, and fabricated pipe—the Crane line includes them all! In steel, iron, brass, or alloy materials, Crane gives you the most comprehensive selection in all types of equipment for power, process, or general utility piping.

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

This high pressure steam system, for example, shows how the Crane line makes easier work of specifying and ordering. One catalog puts everything at your finger tips. One order to your Crane Branch or Wholesaler covers all the equipment you need. Undivided responsibility for materials helps you get a better installation—on schedule! The high quality of all products from Crane means uniform dependability throughout the installation.

Your local Crane Branch is well-stocked to help you get these important piping advantages.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



***IT'S USERS' CHOICE** of steel valves in the complete Crane line of gates, globes, angles, checks . . . in all patterns and sizes . . . in pressure classes from 150 to 2,500 pounds. For steam, services at 600 pounds up to 850° F. maximum, Crane recommends No. 76XR gate valves with Exelloy to No. 49 Nickel-Alloy trim. See your Crane Catalog.*

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FOR EVERY PIPING SYSTEM

-AND HERE'S ANOTHER "FIRST" BY DODGE!

Here is another Dodge development which simplifies and improves power transmission machinery... the Rolling Grip Clutch. Toggles are *eliminated* by employment of ball and wedge principle.

Heavy power-transmitting pressure on the friction disc is developed by a circle of hardened steel balls which are forced into a wedge-shaped groove by the sliding cam.

The "wedge" of cam and groove contours multiplies the force exerted on the shifter collar into a powerful force on the friction disc.

Engagement is easy and positive —smooth as a rolling ball. Great flexibility, ease of control and extreme ruggedness are provided in this modern, compact unit.

Available in Bolted Plate or Gear Tooth Plate series—in sizes from .38 H.P. to 21.2 H.P. at 100 R.P.M. Write for special bulletin, A282.

DODGE MANUFACTURING CORPORATION
Mishawaka, Indiana

ROLLING GRIP CLUTCH

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

He is your local Dodge Distributor—factory trained—qualified to suggest ways to improve your machine performance, increase production. Look for his name under "Power Transmission Equipment" in your classified phone book.

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TRADE PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

KELGIN *smoothes the way...*

FOR

PERFECT PRINTING CONTROL

Printing is under full control when it's done on paperboard prepared with Kelgin, the modern algin surface sizing agent.

Kelgin gives you a surface that is uniformly smooth — makes possible *controlled penetration* of printing inks, oils and waxes. Full ink brilliance, clean sharp printing and true, even color values are assured.

Kelgin is equally soluble in both hot and cold water — is completely adaptable to water box application in the calender stacks. It will not cause foaming, picking or sticking to the rolls. With Kelgin, also, you reduce the curl tendencies of sheets without the need for sizing the back of the sheet.

Full details in terms of your particular application will be sent on request. Write to our Technical Service Department.

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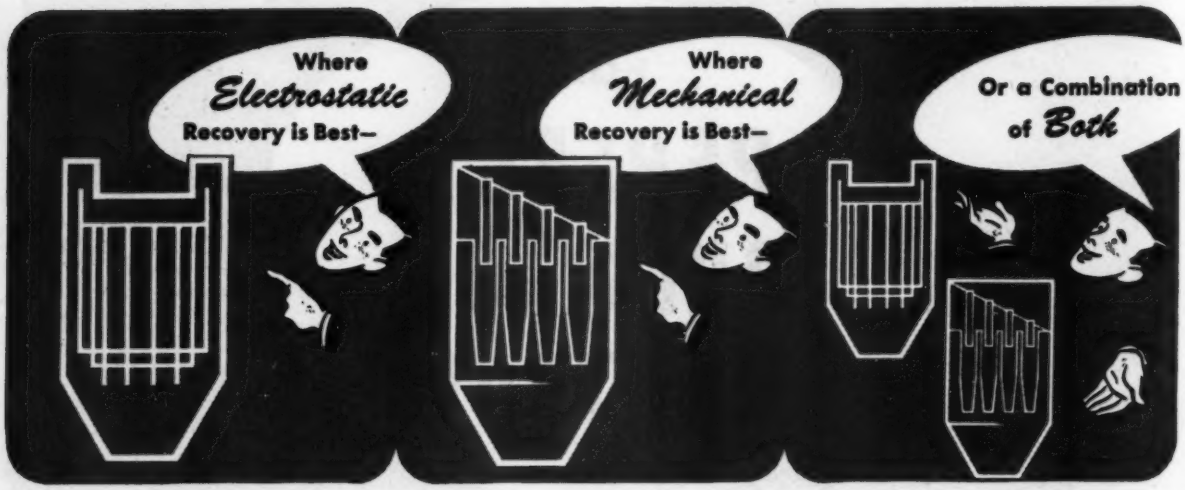
This is the UNIQUE ADVANTAGE

Western Precipitation provides for simplifying YOUR Dust Recovery Problems . . .

If you are not sure whether yours is a job for Cottrell or mechanical separation methods, you'll get an unbiased recommendation from Western Precipitation Corporation because this organization designs, engineers and installs BOTH!



THE *COTTRELL* ELECTRICAL PRECIPITATOR

Western Precipitation is the organization that pioneered the first commercial application of the now-famous Cottrell Electrical Precipitator. And its unique advancements and refinements in the basic methods, developed through more than 38 years of first-hand experience in Cottrell installations, assure you of the most modern in electrostatic recovery equipment from Western Precipitation Corporation. Cottrells handle dust, fume, fly ash, mists and other suspensions with high efficiency.

THE *MULTICLONE* MECHANICAL COLLECTOR

Companion to the Cottrell is Western Precipitation's widely used *Multiclone* equipment which offers far-reaching advantages in the mechanical separation of solids from gases. Its unique vane design makes possible multiple *small*-diameter separating tubes that combine high recovery efficiency with maximum compactness, minimum maintenance and wide-range adaptability to varying installation requirements. For mechanical recovery of solids, *Multiclone* is unsurpassed in operating efficiency, economy and installation simplicity.

COTTRELL AND MULTICLONE

And here's a priceless advantage provided by Western Precipitation Corporation . . . Frequently there are recovery problems where maximum efficiency and economy in first cost are obtained by using *Cottrell* and *Multiclone* equipment working together. There are many such recovery jobs—fly ash is one, perhaps *yours* is another—and you can get such a combination installation from one organization, under one responsibility, with one overall guarantee by bringing your recovery problem to Western Precipitation Corporation.

Send for these MULTICLONE and COTTRELL booklets!

REGARDLESS OF YOUR RECOVERY PROBLEM OR YOUR LOCATION

you can benefit by Western Precipitation's leadership and long experience in the science of recovering suspensions of all kinds—both liquid and dry—from gases, hot and cold. Western Precipitation Corporation installed the first successful Cottrell which is still in operation after 35 years of service. No matter what your industry, Western Precipitation is prepared to serve you in *all* parts of the world. Write, wire or call our nearest office.

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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

NOW SELLING...

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

...in all parts of the U.S.A. and foreign countries.

CB&I TANKS utilized in PULP MILL EXPANSION

We fabricated the two tanks shown at the left and erected them for the Florida Pulp and Paper Company at Cantonment, Fla., with one of our field crews. The left hand structure is a 22-ft. diameter by 25-ft. blow tank; and the right hand installation a 15-ft. diameter by 40-ft. foam tank.

IN the recent expansion program of the Florida Pulp and Paper Company at Cantonment, Florida, several types of Chicago Bridge & Iron Company tanks were installed, including foam tanks, blow tanks, liquor tanks, and digesters. CB&I-built products are chosen for jobs like this because their efficiency and dependability are recognized throughout the pulp and paper industry.

All four CB&I plants have facilities for turning out steel plate structures to meet the specific needs of pulp and paper mills. Designing; fabricating; erecting; stress-relieving and x-raying to meet code requirements; and building tanks with corrosion-resistant linings are among the services we offer.

If you're planning to enlarge your production facilities, or to modernize your existing plant, let us work with you. Write our nearest office for quotations.

CHICAGO BRIDGE & IRON COMPANY

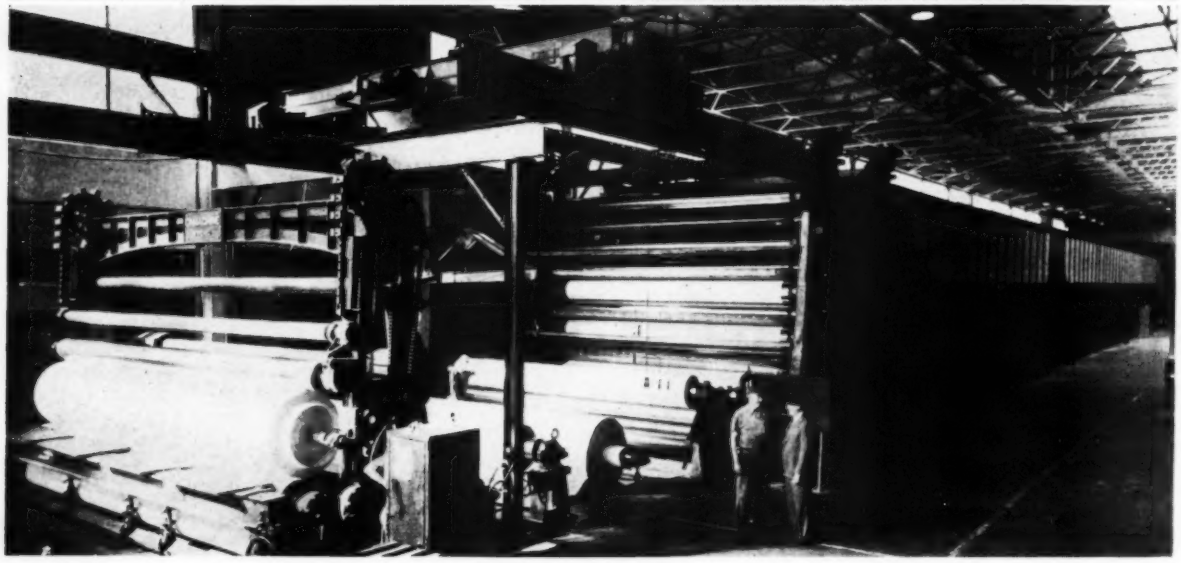
Chicago, 4	2445 McCormick Building	Tulsa, 3	1651 Hunt Building
New York, 6	3350-165 Broadway Building	Houston, 2	2143 National Standard Building
Cleveland, 15	2267 Guildhall Building	Philadelphia, 3	1653-1700 Walnut Street Building
Los Angeles, 14	1459 Wm. Fox Building	Havana	402 Abreu Building
Birmingham, 1	1511 North 50th Street	San Francisco, 11	1217-22 Battery Street Building
Atlanta, 3	2143 Healey Building	Detroit, 26	1566 Lafayette Building

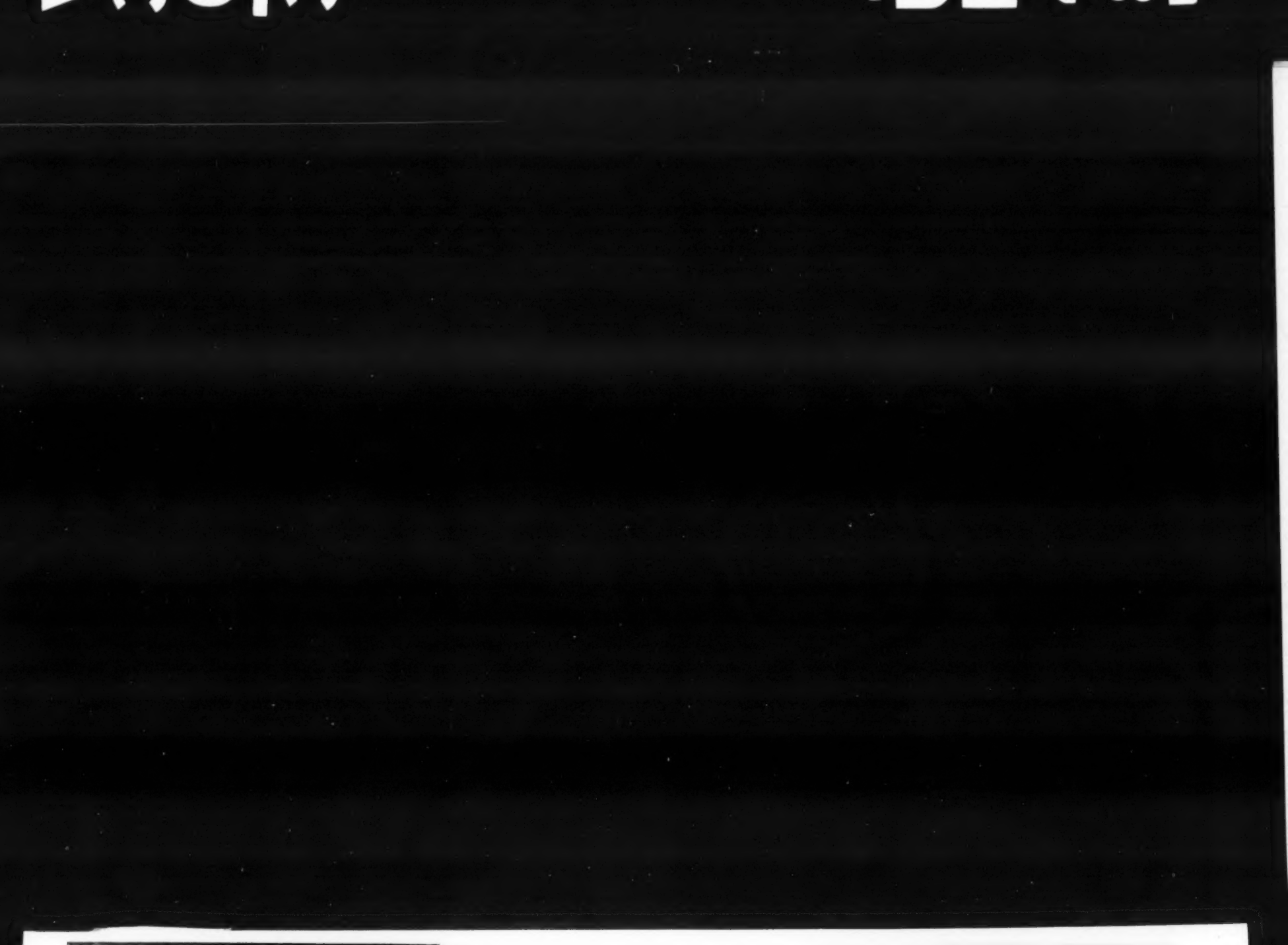
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

Champion Plant and Papermaking Machine

Above—The Canton (N.C.) plant of The Champion Paper and Fibre Company covers more than twenty acres. The Pigeon River, which is its main water supply, flows between the plant and wood yard.

Below—This big paper machine is one of two in the Canton plant which are the largest fourdrinier machines turning out white paper. The machine shown is the first of its kind to operate by electronic amplidyne control.





TRADE WINDS

Champion Holds Three-Day Open House at Canton (N. C.) Division

▶▶▶ REPRESENTING thirty-five different states and three foreign countries, upwards of 10,000 persons were guests of The Champion Paper and Fibre Company at its Canton (N.C.) plant during an elaborate three-day open house program May 4 to 6.

France, Cuba and Africa were represented among the thousands of guests who came to view the mammoth operations of the South's largest manufacturer of white papers. The guests, many of whom were enthusiastic school children, marveled at the speed and size of the company's two great papermaking machines. They were astonished at the over-all size of the Canton plant and expressed wonder over a detailed program of this kind being carried out so smoothly without interruption of production.

The program was open to all Champion employees, their families and friends. The theme of this event was "From Forest to Finished Paper." Bearing out this theme, a carefully

This open house crowd watches with eager anticipation as huge reel is being changed on the No. 11 papermaking machine, claimed to be the largest white papermaking machine in the world

LEFT—Champion's president, Reuben B. Robertson (center) looks over exhibits with W. R. Crute, Houston Division manager (right), and H. A. Helde Canton Division manager . . . RIGHT—Reuben B. Robertson, Jr., executive vice president of the Champion organization, came down from the general offices in Hamilton, Ohio, to be present at the Open House. He is shown here greeting Clyde R. Hoey, Jr., with a broad smile as he enters cafeteria. H. A. Helder, Canton Division manager is in the center

planned exhibit had been prepared and was displayed in the company's cafeteria.

Guests were registered at the Champion "Y" and followed directional signs through the plant. Guides were stationed along the line to answer questions or explain special points in paper manufacture.

On each of the three days, six hours were allotted to visitation but there was disruption of plant operation. The entire three-day program was carried out without any semblance of an accident either to guests or employees. The plant was said to be the cleanest ever observed in its 42-year history. At least 50 guests were so impressed with their first tour of the mill that they came again the following day.

The complete program, including the varied and elaborate exhibits in the cafeteria, was carried out under the supervision of J. Bruce Morford, industrial relations director for the Canton Division, with all other Champions co-operating down the line.

Present during the three-day event were Champion's President Reuben B. Robertson, also Reuben B. Robertson, Jr., executive vice president, and Dwight J. Thomson, a company vice president and director of public and industrial relations, all from the general offices in Hamilton, Ohio.

Dwight J. Thomson, a Champion vice president and director of public and industrial relations for all Champion divisions, admires the "Working with Champion" exhibit as J. Bruce Morford, manager of Canton Division industrial relations, points to special message feature. Mr. Morford was general chairman of Canton's open house program

NEW BRUNSWICK PROVINCE REPORTS ON FORESTRY

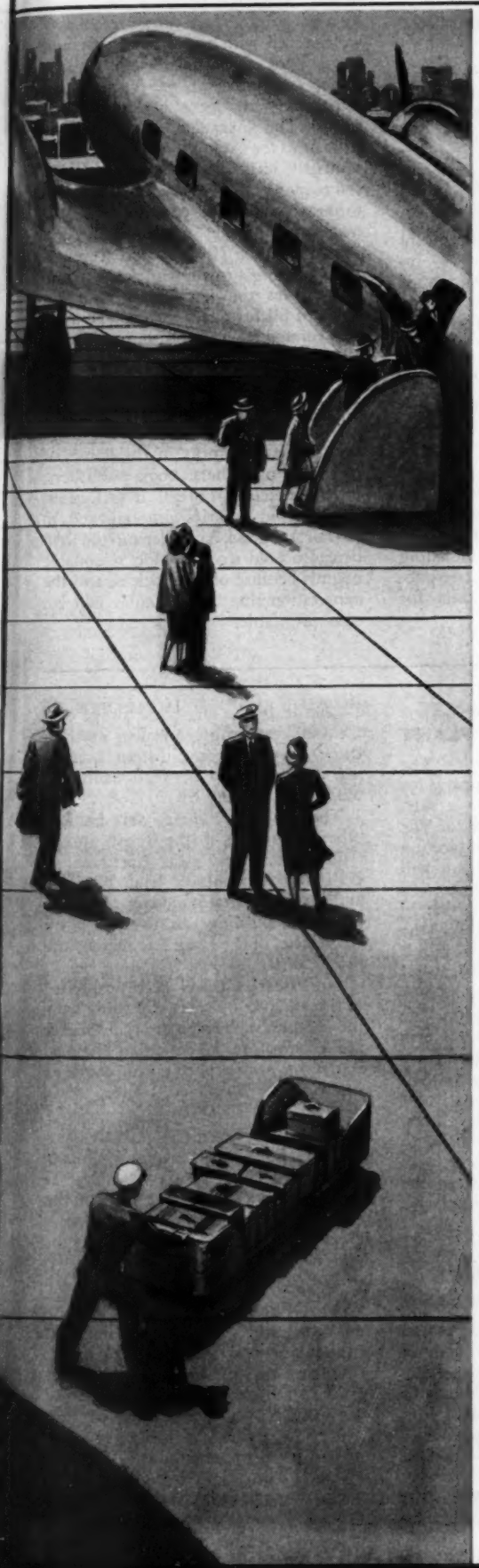
Nearly one million cords of pulpwood were processed in New Brunswick pulp and paper mills last year, Dr. G. H. Prince, deputy minister of lands and mines for the province, told a recent session of the provincial Legislature's committee on forestry and natural resources.

Dr. Prince said that since his department was organized in its present form in 1861, more than $42,000,000 had been received in revenue by the department, from the province's vast forested Crown lands. Last year, he said, New Brunswick pulp mills had processed 935,000 cords of pulpwood and today were one of the greatest assets of the forest industry in the province.

K. B. Brown, head of the photogrammetry division of the department of lands and mines, explained the mosaic system of aerial photographs being compiled by the department, which are used chiefly for spotting types of forest growths throughout the province. Mr. Brown said a mosaic system of indexing had been established by which any photographed section of the province can be picked out. He also revealed that copies of particular areas are available to foresters, lumbermen and pulp and paper officials, and by 1950, they hope to have base maps showing roads and streams of the province at a scale of one mile to four inches and other areas at a scale of one mile to the inch.

W. W. McCormack, the province's chief scaler, said that while the annual cut of logs in the province had dropped from 214 million board feet in 1926 to 79 million feet in 1946, the annual cut of pulpwood and pitprops during the same period had increased from 79,000 cords to 436,000 cords.

PAPER · · · America's 6th Industry



PAPER FILLER FOR AIRPORT RUNWAYS

(NEWS ITEM: *More than 4,000 miles of joints on airport runways have been sealed with a new paper cord and rubber compound.*)

A new development which uses paper cord as a base promises to end the prob'em of sealing joints on airport runways. Combined with rubber, this new filler is applied by a special machine. Cracks are dammed with paper cord and then sealed with a rubber compound. Expansion and contraction of concrete which forces asphalt out of joints, holds no threat for this new filler. It may soon be used on traffic highways. We will gladly supply manufacturer's name on request.

Auto seat covers made of paper . . . clotheslines made of paper . . . recording tape made of paper . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities — new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines. Additional capacity in Metals Fabrication is now available through conversion of facilities formerly devoted to the building of ships.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

All Papers—Except Newsprint—
Show Gain First Quarter

▶▶▶ ALL PREVIOUS quarterly production records in the pulp and paper industry were broken in the first three months of this year, resulting in further general improvement in the supply-demand relationship for practically all grades and items of paper, board and products, according to the Department of Commerce Pulp and Paper Industry Report for May.

W. L. Neubrech, chief of the Pulp and Paper Unit, Office of Domestic Commerce, said that reports from various parts of the country indicated that during April and early May the market appeared to reach a state of near balance, with exceptions noted for newsprint and kraft paper and bags. He stated that other items, such as toilet tissue, are reported scarce in localized areas.

The overall improved condition in paper supply should not be construed to indicate a soft market, Mr. Neubrech stressed, since mill allocation remains for most manufacturers on most grades. Allocations, however, have been increased, deliveries are more prompt, and desired specifications and better qualities are more easily obtained.

Paper merchants, as well as most mill executives, are optimistic concerning the remainder of 1948. The consensus appears to be that the market, with respect to supply, demand, inventories, and prices, has leveled off, and will maintain a more modest upward trend than the plotted chart lines have shown since the end of 1945. Production and supply of paper board, and products is expected to keep pace with overall industrial and economic activity, and a steady market for several months may be looked for.

Paper merchants in various sections of the country advised Commerce Department Field Offices that during April and early May, allotments from mills were increased on most grades, and that in some instances items have been removed from allotment.

According to the Department report paper is rapidly approaching a competitive market and merchants are "cleaning" stocks and watching inventories closely. Some wholesalers state that mills have caught up on merchants' orders faster than anticipated, with the result that distributors' receipts are tending to exceed their deliveries.

Paper production in the first quarter of 1948 showed a greater advance over the same period of 1947 than did paperboard, Mr. Neubrech pointed out. Aggregate paper production, amounting to 2,785,000 tons in the first 3 months of 1948, was 6.6 per cent above the same period a year ago, while paperboard output of 2,345,000 tons increased 3.4 per cent over the first quarter of 1947.

Only item in the paper group to record a decline during the quarter was newsprint, which dropped 5 per cent below the first quarter of 1947. Increased output of other grades ranged from approximately 1 per cent for fine paper up to 30 per cent for tissue papers, over production in the first three months of last year.

Mr. Neubrech said that the 5 per cent drop in newsprint output was due to conversion in past months of a few former newsprint machines to other types of papermaking. It is probable, however, that newsprint output during the remainder of this year will go up moderately over the first quarter level, as the result of new facilities, including purchase by groups of newspaper publishers of West coast paper mills, for production of newsprint.

In the printing field, book publishers, magazine publisers, and commercial printers are now reasonably well served with paper needs. By and large, book publishers were the first major consumers of paper to secure, after the war, most of their paper needs. The magazine publisers were probably the second to obtain substantially larger supplies of paper. In some cases this was accomplished through purchase of paper mills by the magazine publisher. However, the commercial printer (with some exceptions for a few big firms buying direct from mills) was the last in the printing fields to fill his paper needs. The average commercial printer buys through wholesale paper merchants and it was not until in recent months that he was able to get about all he required.

No current data are available on printing paper stocks in the hands of magazine publishers, book publishers, or commercial printers. In all cases, however, inventories are believed to be fair to good, considering the tendency to hold stocks within reasonable bounds because of high prices, and the expectation that better grades will become available.

MUTUAL LIFE INSURANCE TO FINANCE I.P.I. PLANT

Interchemical Corporation and The Mutual Life Insurance Company of New York have entered into a sale-and-lease agreement providing for The Mutual Life to finance the construction of a one-story printing ink plant and research laboratory for Interchemical's International Printing Ink Division in Elizabeth, New Jersey, and for the property, upon completion of the building, to be leased back to Interchemical for a long term.

The agreement provides for The Mutual Life to purchase a 12½ acre tract of land at Elizabeth and to finance the cost of improvements up to $1,600,000. Following completion of construction about the end of this year, the property will be leased back to Interchemical for twenty-five years with the manufacturing firm having the option of renewal for five successive terms of ten years each.

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FOREST FIRES IN ONTARIO DESTROY VAST TIMBERLAND

About fifteen forest fires roared across 200 square miles of northern Ontario during the first week of June, destroying rich timber, endangering lumber camps, and killing wild life. Two huge fires merged in the Mississagi and Chapleau area and burned on a 72-mile front. The blaze swept over 150,000 acres of green timber north of Blind River, Algoma district lumbering town midway between Sault Ste. Marie and Sudbury.

Thousands of fighters were battling other major fires in the Rouyn area in Godfrey township near Cochrane, at Gull Bay peninsula of Lake Nipigon, and in the Geraldton area. Smaller fires were burning northwest of Sault Ste. Marie, in the Long Lac region, and near Hearst.

Nonessential travel was prohibited in the 50,000,000 acres stretching from the Manitoba border to the Quebec border, north to the Canadian National Railway's northern line and south to North bay.

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▶▶▶ THE LAKE SHIPPING season in the South Haven, Michigan, area was opened on May 5 when the *S. S. Hammildoc* carried a 2,000-ton cargo of wood pulp from Baie Comeau, Quebec. The vessel was operated by the Patterson Steamship Company.

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▶▶▶ OFFICIAL SOURCES in Canada and the United States deny the truth of repeated reports that the two countries are discussing an economic union. The American version is that the talks have been devoted to such matters as dollar exchange and Canadian import restrictions.

Good Going

It heartens us to swap a friendly "Cheerio" with the sprites of the Founders—John Moore and J. Atwood White—as they flit by on Cloud 16. Their enthusiastic endorsement of what we've been up to in the past couple years is definitely flattering.

Their original establishment—which came into being to execute an order for four slitters—bore little resemblance to the present Moore & White plant. Just as great is the contrast of conditions in the papermaking industry today with the cloistered calm of 1885, when they set up shop.

Things now are—if we may coin an elegant phrase—on a root-hog-or-die basis. Even with paper-supply lagging behind demand, competitive pressures are fierce and mounting. Down-time is a luxury that few makers of paper or paperboard can afford in quantity.

Today, Moore & White—with plant-capacity doubled, and with an array of technical and production personnel unmatched in its history—offers prompt and effective service in the repair and rebuilding of obsolescent machines which are not earning their salt.

We'll be glad to supply you with complete new assemblies, of course. But if your present needs call rather for component machines or replacement parts—the rejuvenation and speeding-up of ageing equipment—a Moore & White sales-engineer is ready to dig into your problem today. Call upon us.

The MOORE & WHITE Company

15TH STREET AND LEHIGH AVENUE • PHILADELPHIA 32, PA.

Custom-built machines for makers of paper and paperboard

Washington News

HOUSE OPPOSES EXTENSION OF RECIPROCAL TRADE ACT

The House of Representatives, on May 26, rejected the demand of the Administration for an extension for three years of the Reciprocal Trade Agreement Act which expires June 12. Instead, the House adopted by a large majority the so-called Gearhart substitute, a measure reported by the Ways and Means Committee, which extends the Act for one year, with provisions for the prevention of injury to domestic industry. As explained in the Committee report, the new measure is the first effort at scientific tariff legislation for fourteen years. Under the bill passed by the House of Representatives, the power of the president to make reciprocal trade agreements is extended for one year, but instead of giving the State Department the power to negotiate agreements in its judgment as to the economic effects of reciprocal tariff action, any proposed negotiations with any country must be announced, and an investigation conducted by the United States Tariff Commission to determine within what limits tariff rates can be reduced without injury to domestic industry. If the president concludes negotiations under the Act, in which any rates are changed to a greater degree than recommended by the Tariff Commission, the agreement is not effective until the Congress has had sixty days in which to disapprove the president's action. If the recommendations of the Tariff Commission are followed, any agreement can be put into effect automatically.

In the view of the Republican majority in the House of Representatives, the new procedure removes tariff negotiations from the field of international politics and makes any agreements subject to scientific study.

The debate over the measure was incisive. The Democrats charged that the Gearhart bill was jammed through by gag rule, while the Republicans denied that it could possibly be interpreted as a retreat by this country from its support of the E.R.P. Secretary Marshall, who said the substitute was worse than nothing, was sharply attacked, and acid comments were made on his inaction at the time of Pearl Harbor and the so-called muddling of the United States foreign policy.

The measure now goes to the Senate, where prompt committee action is anticipated. It is said that the Senate Republican leaders are in harmony with the House action, but the Democrats will make a bitter fight for the extension of the present Act without change. The action of the House was by an almost unanimous party vote. If the Gearhart bill is passed by the Senate, Secretary Marshall's statement may be a cue to a possible veto by the president.

The action of the House was to all intents and purposes in harmony with the position of the paper industry. The American Paper and Pulp Association and the National Paperboard Association both filed briefs showing the effects of past agreements as an indication of further injury which might be suffered by an extension of the existing Act. Both great organizations opposed the extension of the existing Act "in its present form," but with no suggestion that the Tariff Commission be substituted as an expert agency in the determination of the safety zone within

NEWSPRINT PROPOSAL OF MARSHALL PLAN CAUSES DEBATE IN WASHINGTON

The Marshall plan program for European rehabilitation and the proposal to use United States funds to buy newsprint and pulp for Europe is causing no little stir at Washington. Representative Brown, Chairman of the House of Representatives special newsprint committee, has written E. C. A. Administrator Paul Hoffman that the reported plans would result in a great shortage of newsprint in the United States and an increase in gray market operations. Testifying before the Senate Appropriations Committee, Mr. Hoffman said that newsprint plans were still in abeyance. One proposal is that the State Department plans to provide 210,000 tons of newsprint in 1948-49, the United States furnishing $25,000,000 of the $52,000,000 cost of the paper to be furnished by Canada.

Port Wentworth Mill now in Production

Air view of Southern Paperboard Corporation's new linerboard mill at Port Wentworth, Georgia, which went into production on June 1

5.4 or 108 inch . . . every *Magic-Grip* Sheave is "Easy On . . . Easy Off!"

Largest Ever Built! This specially-built 108 inch *Magic-Grip* sheave was ordered for the same reason that thousands of smaller stock sheaves are ordered. It comes completely assembled . . . goes on the shaft without a struggle . . . grips like a vise . . . and is just as easily removed! Stock *Magic-Grip* sheaves from 1 to 250 hp are available through your nearest Allis-Chalmers dealer or district office.

Get Magic-Grip Sheaves In "Pre-Engineered" Drives

New 144-page "Pre-Engineered" *Texrope* drive manual lists 22,000 economical stock drives from 1 to 150 hp — meets 90% of all V-belt drive requirements. Ask for Bulletin 20B6956. ALLIS-CHALMERS, MILWAUKEE. *Texrope, Super-7, Texsteel, Texdrive, Magic-Grip* and *Vari-Pitch* are Allis-Chalmers trademarks.

A 2430

A Complete Range of Products		
Super-7 V-belts	5 types . . . sizes to suit every power transmission job	
Texsteel, Texdrive, Magic-Grip	Sheaves in a full range of sizes and grooves	
Vari-Pitch Sheaves	Exact variations in speed — Stationary or Motion control	
Speed Changers	Speed variations up to 375% at the turn of a crank	

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS

Originators of the Multiple V-belt Drive for Industry

which future agreements can be negotiated.

Some major groups of the paper industry, as well as some of the smaller tonnage groups, would be affected by the extension of the present Act, but will have an opportunity to present arguments if future agreements are proposed. Under the existing lawbook and groundwood printing paper duties could be reduced from approximately 10 per cent to 5 per cent. Kraft wrapping could be reduced from the present rate of 20 per cent to 10 per cent, and other wrappings could be reduced from 25 per cent to 12½ per cent.

FLASH! As this issue closes, the House has passed the RTA bill after accepting amendments tacked on by the Senate when it adopted the measure on June 14. Unless the President vetoes the bill, it will revive the Act which expired at midnight on June 15.

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NEW TYPE PULP MILL TO BE BUILT IN GREEN BAY

The Green Bay Paper & Pulp Company, Green Bay, Wisconsin, has started construction of a new paper and pulp mill which will employ a recent technique in the pulp making process developed by the Forest Products Laboratory at Madison, Wisconsin. Cost of the land, buildings, and equipment of the new mill is estimated at $1,150,000.

The new technique to be used is the semichemical treatment of pulp, and is said to produce a yield of 80 per cent on wood fibers, as compared with the 50 per cent obtained by present methods. It is suitable for such hardwoods as birch, maple, oak and elm, which cannot be used in present papermaking processes, and makes use of all types of wood wastes.

The mill will turn out corrugating and liner board for shipping boxes, according to George Kress, president. Mr. Kress is also president of the Green Bay Box Company, whose stockholders are the incorporators of the paper firm.

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FINANCIAL

▶▶▶ PAPER MILL SECURITIES followed the course of the bull market which seems to be in full swing, practically every issue showing advances over a month ago.

American Writing Paper Corporation—Net loss in the first quarter of 1948 was $15,656 as against a profit of $179,926 for the same quarter in 1947.

A.P.W. Products Company—Net income for the three months ended March 31 was $83,238 as against $32,398 for the same quarter in 1947.

Chesapeake Corporation—Net earnings for twelve weeks ended March 28 were $742,209 as compared with $824,367 for the comparable period in 1947.

Continental Diamond Fibre Company—Net income for three months ended March 31 was $226,894 as against $276,841 in the same quarter of 1947.

Eastern Corporation—Net income for the quarter ended March 31 was $522,477 as against $326,388 a year ago.

Gaylord Container Corporation—Net income for three months ended March 31 was $2,087,689 as against $2,064,698 for the same quarter of 1947.

Great Northern Paper Company—Net income for three months ended March 31 was $868,889 as against $1,089,278 for the same quarter in 1947.

Hinde & Dauch Paper Company—Net income for three months ended March 31 was $1,163,029 as against $1,130,245 for the same quarter in 1947.

International Paper Company—Net income for the first quarter of 1948 was $11,813,408 after appropriating $1,500,000 for a reserve fund to provide for replacement of capital assets at the excess of current cost over the original cost. Net income for the same quarter of 1947, without such an appropriation, was $11,660,540.

Kimberly-Clark Corporation — Net income for three months ended March 31 was $1,822,453 as against $1,957,826 for the same quarter in 1947.

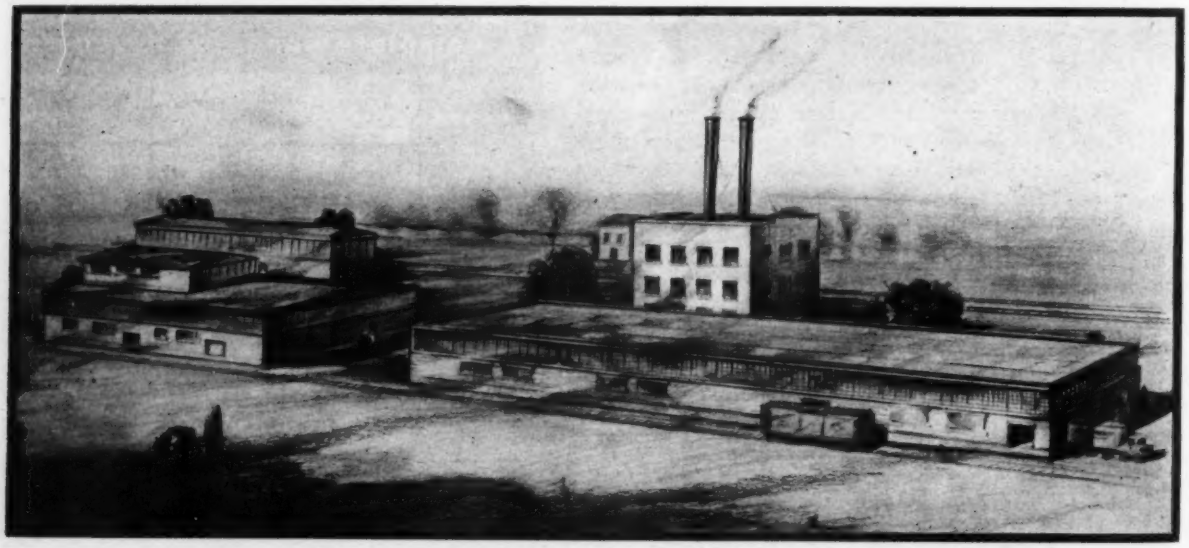
Marathon Corporation—Net income for six months ended April 30 was $2,782,895 as against $2,484,061 for the comparable period in the previous fiscal year.

National Container Corporation—Net profit for three months ended March 31 was $1,830,583 as compared with $3,109,024 for the same period in 1947.

Puget Sound Pulp & Timber Company—Net income for three months ended March 31 was $1,592,624 as against $1,078,611 for the same quarter in 1947.

Scott Paper Company—Net income for three months ended March 31 was $719,441 as against $627,522 in the same quarter of 1947.

United Board & Carton Company—



Architectural drawing of plant to be built at Green Bay Pulp and Paper Co., Green Bay, Wis.

CHEMICAL USERS' GUIDE To General Chemical Products for the Paper Industry

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. *(Alum)*	Commercial & Iron Free: Lump, Ground Powdered	17.25% Al_2O_3	Bags Bulk Carloads	Precipitation of resin size and filler; water clarification; manufacture of satin white; pitch control; mordant for dyes.
Aluminum Sulfate $Al_2(SO_4)_3$ + water *(Liquid Alum)*	Liquid	32° Be (total Al_2O_3 7.2%)	Tank Trucks Tank Cars	Same as commercial dry product but lower strength.
Salt Cake Na_2SO_4 *(Sodium Sulfate)*	White or Grayish Granules	95-99% Na_2SO_4	Bags Bulk Carloads	Used in kraft cooking liquors as the source of Na_2S.
Glauber's Salt, Crystal $Na_2SO_4 \cdot 10H_2O$ *(Sodium Sulfate)*	Colorless Crystals	96% $Na_2SO_4 \cdot 10H_2O$ (42.3% Na_2SO_4)	Bags Barrels	Substitute for salt cake in kraft cooking liquor.
Glauber's Salt, Anhydrous Na_2SO_4 *(Sodium Sulfate)*	White Granules	99.5% Na_2SO_4	Bags Bulk Carloads	Same as Crystal but stronger product.
Sulfuric Acid H_2SO_4	Liquid	66° (93.19%), 99% 20% oleum and higher strengths	Carboys Steel Drums Tank Trucks Tank Cars	Wire scouring; parchmentizing; acid wash in last stage of multi-stage pulp bleaching; neutralizing tall oil soaps.
Sodium Thiosulfate $Na_2S_2O_3 \cdot 5H_2O$ *(Hypo)*	Colorless Crystals	99.75% $Na_2S_2O_3 \cdot 5H_2O$	Bags Fibre Drums	Anti-chlor.
Sodium Sulfite, Anhydrous Na_2SO_3 *("Sulfite")*	White Powder	98.5% Na_2SO_3	Bags Fibre Drums	Anti-chlor.
Sodium Silicate $Na_2O \cdot XSiO_2$ + water *(Water Glass)*	Liquid	38°, 41°, 42° Be; special and higher strengths	Steel Drums Tank Cars Tank Trucks	Adhesive for corrugated and solid fibre board; used in coating mixtures to reduce viscosity and in beater sizing to stiffen paper.
Chromium Potassium Sulfate $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ *(Potash Chrome Alum)*	Red Violet Crystals	99.5% $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$	Fibre Drums	Used in "save-all" or white water systems.
Aqua Ammonia NH_4OH + water *(Ammonia)*	Colorless Liquid	26° Be (29.4% NH_3)	Carboys Steel Drums Tank Trucks	Used with chlorine to form chloramines for slime control.
Sodium Fluoride	Powder	90% NaF 95% NaF	Barrels Fibre Drums	Preservative and stabilizer for starch in coating mixtures.
Tetrasodium Pyrophosphate, Anhydrous $Na_4P_2O_7$ *(TSPP) (Pyro)*	White Powder	98% $Na_4P_2O_7$ (Equiv. 52% P_2O_5)	Bags	Felt washing; pitch dispersion.
Nitric Acid HNO_3 + water	Liquid	42° Be 67.2% HNO_3	Carboys Drums Tank Trucks	Nitrating pulp; cleaning monel metal.
Sodium Sulfide Na_2S + water	Red Chips or Solid Mass	60% Na_2S	Steel Drums	Substitute for salt cake in modified soda process.

BASIC CHEMICALS FOR AMERICAN INDUSTRY

OTHER PRODUCTS: Hydrochloric Acid; Sodium Metasilicate; Trisodium Phosphate; Copper Sulfate; Disodium Phosphate.

FOR THE LABORATORY OR SPECIAL APPLICATIONS: BAKER & ADAMSON REAGENTS and FINE CHEMICALS.

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In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

Net earnings for twelve weeks ended May 1 were $208,309 as against $435,526 in the comparable period of 1947.

West Virginia Pulp & Paper Company—Net income for 1947 was $5,130,776 as against $5,175,959 in 1946.

Paper Mill Corporate Changes

Idaho - Montana Pulp & Paper Company—A proposed issue of 100,000 shares of 4 per cent cumulative preferred and 500,000 shares of common stock at $100 and $10 per share respectively, has been registered with the Securities and Exchange Commission. The funds will be used for the construction of a bleached kraft pulp mill at Polson, Montana.

New York Stock Exchange—Stocks

	Closing Prices May 25	April 24
A.P.W. Products	6¼	5
Celotex	32	27¼
Same Preferred	19⅜	18⅝
Certain-teed Products	19⅜	17
Champion P & F Co.	23⅞	23⅝
Same Preferred	*96-100	96
Chesapeake Corp.	*29¾-30	.....
Container Corp.	37½	39½
Same Preferred	99½	*96-98
Continental Diamond	12⅜	11½
Crown Zellerbach	33⅞	30⅞
Same Preferred	*100-100½	98¼
Same $4 Preferred	126½	113½
Dixie Vortex	39	37½
Same "A"	50½	53
Robert Gair	9¼	8⅝
Same Preferred	17⅛	*19-20
International Paper	62	56¾
Same Preferred	98	*96-98
Kimberly-Clark	23¼	22⅛
Same Preferred	101	102⅞
McAndrews & Forbes	38½	38
Marathon	24⅝	20¾
Masonite	65½	58½
Mead Corp.	22¾	20⅛
Same Preferred	*95-95½	82
Same 2d Preferred	46	*40½-41
National Container	13	12¾
Paraffine Cos.	27¼	26
Same Preferred	102½-105	*103-105
Rayonier, Inc.	32	28¾
Same Preferred	*37¼-37⅝	32¾
Scott Paper	50	44½
Same Preferred	*93-94½	*91-92
St. Regis	13¼	10¾
Same Preferred	*88½-90	85
Sutherland Paper	42½	39½
Union Bag & Paper	38⅝	33½
United Board & Carton	13⅞	13½
U.S. Gypsum	108½	100
Same Preferred	*178-182	*175-177
West Va. P.&P.	50⅛	46
Same Preferred	108¾	105

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P & F 3%	.....	.....
Certainteed 5½%	.....	.....

New York Curb Exchange—Stocks

Am. Writing	7	7½
Great Northern	41½	41
Taggart	.....	.....

*Closing Bid and Asked Prices.

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IMPORT NOTES

A Mexican mill which has been shipping kraft wrapping paper to this country has shipped 600 tons of kraft test liner to the United States according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry, the material is dutiable at 10 per cent under the new Geneva trade agreements and will cost the consumer $170 per ton plus freight from Mexico.

Counter rolls made of standard newsprint, 9 inches in width, are being shipped to this country as standard newsprint duty free, for use as substitutes for sulphite wrapping paper, but the officials will probably classify the material as dutiable printing paper.

Canadian end sheet paper is being imported from Canada for use in pocket book publications.

All of February's imports of processed board were at values which entitled them to entry at the new Geneva rate of 7½ per cent, as against a rate of 10 per cent for unprocessed or plain paperboard.

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STRAW PULP USED TO MAKE NEWSPRINT AT THOROLD

At the Thorold (Ontario) mill of Ontario Paper Company newsprint was produced from groundwood and sulphite pulp mixed with straw pulp on May 21.

This commercial run was conducted under the supervision of Department of Agriculture experts through use of processes developed at the Northern Regional Research Laboratory in Peoria, Illinois, with some slight modifications for commercial production.

The addition of 15 to 20 per cent of bleached straw pulp to the groundwood sulphite blend required no changes in the machine operation and the total furnish was run over the 1,120 fpm 200-in. machine during a period of about six hours, without a single break due to the straw pulp.

About 30 tons of newsprint containing 15 to 20 per cent straw pulp was made during this run. The straw-containing paper seemed to be smoother and appeared to have better formation. It is expected that this paper will be used shortly in the regular production schedule of the *Chicago Daily Tribune*.

▼

U. OF FLORIDA SOON TO OPERATE LABORATORY FOR PAPER RESEARCH

A completely equipped pulp and paper laboratory, designed for long-range research into problems peculiar to the southern paper industry, is about to begin operations at the University of Florida, W. J. Nolan, associate research engineer of the Engineering and Industrial Experiment Station, told members of the Florida Engineering Society in final convention session.

Pointing out that the laboratory has been under construction for the past eighteen months, Mr. Nolan said it is hoped that research into all chemical, semichemical and mechanical processes for producing pulp will fill the long felt need for promotion of the industry in the South.

▼

BRITISH PAPER NOTES (April, 1948)

While demand on the British Paper Trade continues, it does not appear to be so pressing and insistent as over the past few months. The difficulty is that paper purchasing is now so circumscribed by license that once the agreed quotas during each license period for the many different usages have been fulfilled it appears useless to make further attempts. Beyond this there is no "free" paper and only export requirements are likely to receive sympathetic treatment. The export market is not so easy as it was a few months ago.

Under normal conditions this would be the time for expansion of weekly and other journals, new ventures in publications, much larger impressions of publisher's items, heavier advertising and greater publicity and a general move forward all around. Everyone of these and similar schemes would mean greater consumption of paper. But under present conditions all this is at a complete standstill and so long as the paper trade and other trades are bound hand and foot by government control, so long will they continue to drag along from license period to license period. In effect many trades are becoming overstocked and if export targets are not reached and some means found to dispose of these stocks, then the inevitable result will be widespread unemployment.

According to a Parliamentary reply the consumption of paper and board in the United Kingdom during 1938 was 3,700,000 tons which declined to 1,350,000 tons by 1943 and increased to 2,100,000 in 1947. It is estimated that consumption this year will decline by 50,000 tons. Lower production means higher costs and it is difficult to see how this will tally with the Government's desire to keep prices at their present level. Concurrent with this the purchasing power of the public is gradually waning.

Happily there is a tentative promise that more paper will be available during the next license period. But as so frequently in the past, promises of greater abundance have proved to be smaller amounts in actuality. This promise was made at the annual general meeting of the National Association of Paper Merchants at which Ian R. Ferguson was elected president.

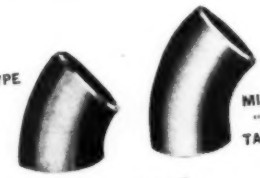
Generally speaking the paper trade during the first quarter of this year shows an improvement over the same

IMPROVE PIPING DESIGN and REDUCE COSTS with . . . MIDWEST WELDING FITTINGS

90° ELBOWS

REDUCING ELBOWS

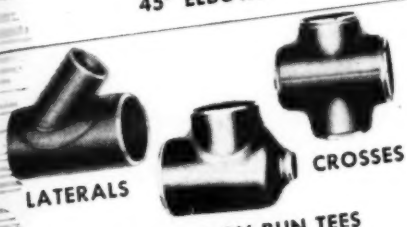
TEES



45° ELBOWS

180° RETURNS

LAP-JOINT STUB ENDS



REDUCING-ON-RUN TEES

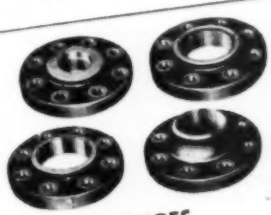
REDUCERS

SLEEVES

CAPS

SADDLES

SHAPED NIPPLES



FLANGES

To simplify and improve piping design, Midwest originated and developed many of the fittings shown here. For example: the Midwest Reducing Elbow (available in sizes including 12") decreases turbulence and pressure drop when used instead of a standard elbow and a reducer; more than one third of the welding is also saved. Midwest Long Tangent Elbows save pipe and time in lining up. Midwest Saddles compensate for weakening of header body resulting from metal removed for nozzle opening. Midwest Welding Fittings stocks are carried in all principal cities . . . get in touch with your distributor.

MIDWEST PIPING AND SUPPLY COMPANY, Inc.

Main Offices: 1450 South Second Street, St. Louis (4), Mo.

Sales Offices: New York (7), 30 Church St.

Chicago (3), 79 West Monroe St. • Los Angeles (33), 520 Anderson St. • Houston (2), 229 Shell Bldg.
Tulsa (3), 533 Mayo Bldg. • South Boston (27), 426 First St. • Distributors in Principal Cities.

period last year. Both printing and writing paper exports, excepting newsprint, have improved but the most striking advance is that of coated papers and boards, the exports of which now stand at 190 per cent of prewar. Transparent cellulose wrapping is another item which is constantly expanding and a further feature of these exports is the higher deliveries to both Australia and New Zealand.

Imports of materials are also higher than for the first quarter of 1947. But as this was the period of the exceptionally bad weather in Europe, this is understandable and only comparisons with later periods in the year will show whether this is an actual broadening of these imports. The latter, incidentally, has passed the prewar rate of importation. Also while materials imports from Sweden have declined by 20,000 tons, those from Canada are up from 15,646 to 28,224 tons and from Finland from 19,076 to 55,274 tons. Imports of paper and boards are practically the same as in 1947 but it is noted that the United States has sent 2,919 tons against 472 tons.

Further information concerning the china clay industry resulted from a Parliamentary question which disclosed that 1947 production was 625,000 tons, of which 40 per cent was exported. It was hoped during the present year to raise production to between 800,000 and 850,000 tons. In 1947 83,000 tons went to the United States and an effort is being made to raise this to 275,000 tons during the present year with a grand total of 350,000 tons for all countries.

▼

PAPER TECHNOLOGY COURSE ADDED TO CURRICULUM AT WESTERN MICH. COLLEGE

A vocational course in paper technology has been added to the curriculum at Western Michigan College, Kalamazoo, Michigan. This four-year course will lead to the degree of Bachelor of Science.

This development has been worked out during the past two years co-operatively by the College and the technical men of the paper industry in the Kalamazoo Valley. Behind the movement are the Kalamazoo Section of the Technical Association of the Pulp and Paper Industry and the Michigan Division of the American Pulp and Paper Mill Superintendents Association.

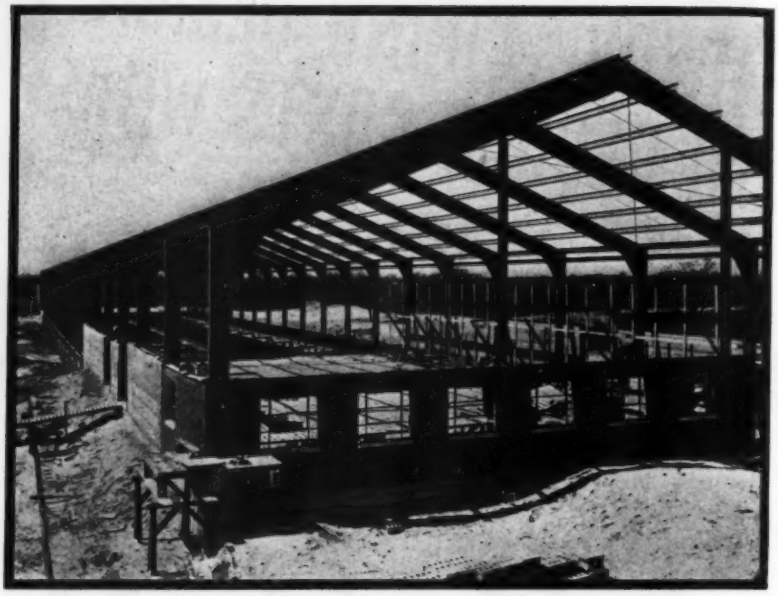
The total number of semester hours required for graduation is 140, which makes this curriculum a most vigorous one so far as graduation requirements are concerned. The plan of instruction is functional, and although not an engineering program, it does provide for actual paper mill experience during the summer.

New buildings are now under construction on Western's campus which will house new papermaking laboratories as well as classrooms.

An advisory committee composed of the following representatives of the paper industry will co-operate with Doctors Gerald Osborn and Deyo B. Fox, of the College:

Max Bardeen—Lee Paper Company
Dwight Stocker — Michigan Paper Company
William Kirkpatrick—Allied Paper Mills
Paul Bartholomew—Hawthorne Paper Company
A. L. Sherwood—Sutherland Paper Company
Rudolph Germanson — Kalamazoo Vegetable Parchment Company
Ernest E. Ludwig—Birmingham and Prosser Company

It is expected that this new course will be in full operation by the first semester of the college year in 1948.



Recent photograph showing construction progress at Gary Paper Mills

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GARY NEWSPRINT PLANT IS ALMOST FINISHED—GEORGE ENGERT IS MILL MANAGER

The new plant of the Gary Paper Mills, Inc., Gary, Indiana, is about 75 per cent completed. The main building of this mill, which will manufacture newsprint from de-inked pulp, is 484 ft. long and 80 ft. wide, and is sufficiently large to permit the addition of a second and larger paper machine. The first machine, which is ready for installation as soon as the building is completed, is 108-inch trim, and will produce about 50 tons of newsprint per day. The length of the building makes it possible to add more dryers.

George Engert, formerly of Cheney Bigelow Wire Works, has been appointed manager of the plant and already is on the job supervising work preparatory to installation of the equipment.

The Gary Paper Mills, Inc., is headed by J. R. Snyder, publisher of the *Gary Post Tribune*. Associated with the company are five large midwestern newspapers, including the *Post Tribune*. (Cf. P.I. and P.W. Nov., 1947)

▼

AUSTRALIAN PAPER NEWS

Associated Pulp and Paper Mills, Ltd.

The immediate program of the Associated Pulp and Paper Mills, Ltd. includes the commencement of production in the middle of 1948 of the No. 3 paper machine with the No. 4 machine promised for delivery in about two years. It has been decided to erect a large sawmill to cut pulpwood, as well as commercial timbers and also a mill for the production of hard-pressed fiberboard. The construction and operation of the sawmill and hard board mills will be carried out by the subsidiary, Paper Makers Proprietary Limited.

The Associated Pulp and Paper Mills, Ltd. was formed in 1936 at Burnie, Tasmania, after years of research to prove the practicability of making fine grades of papers from eucalyptus pulp. The first paper machine began commercial production in August, 1938, and the pulp mill be-

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In many paper-making plants Bridgeport Model 179, illustrated, has proven itself more than just a knife grinder. It will handle a wide variety of straight face grinding operations such as suction box covers of brass and fibre, frames for paper-making machines and many of the odd jobs that are always cropping up in any plant maintenance shop.

Have you a particular knife grinding problem in your plant? If you have, call in Bridgeport. Our engineers and maintenance men will be glad to share their long experience with you no matter what make of grinding machine you are using.

Complete information on the Bridgeport Model 179 will be sent upon request. Your inquiry will receive immediate attention.

THE RIGHT WHEEL FOR EVERY JOB

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Bridgeport GRINDERS

Horizontal Face Grinders, Vertical Grinders, Cutlery Grinders, Buffing Lathes, Knife Grinders, Floor Grinders, Abrasive Cut-off Machines, Buxite Abrasive Wheels.

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gan operations in December of the same year. Losses were not avoided in the early years, but profits were obtained after 1940. The outbreak of the war brought enormous orders which made extensions to the plant necessary and more capital had to be introduced to cope with the expansion. At the 1947 balance, paid-up capital was £1,600,000. Capital was doubled in June of that year and 1,600,000 shares were offered at par and payable 1/- on acceptance and calls totalling no more than 5/- per share in any successive months from the date of allocation, namely August 1, 1947.

Thomas Owen & Company

Thomas Owen & Company (Australia) Ltd., which has been formed with £2,000,000 capital to establish a paper mill at a former gun-cotton factory at Ballarat, Victoria, has offered 750,000 £1 preferred shares (5 per cent) for public subscription. The issue was immediately oversubscribed. It is understood taht Thomas Owen & Company, Cardiff, and another leading English papermaking group have subscribed privately to an initiial £750,000 ordinary capital in 5/- shares.

Preparations for the commencement of operations of the mill are well-advanced, but there may be some delay as the Victorian Health Commissioner refused the British company's application for an increase in the amount of effluent it might deposit in the Yarrowee Creek near Ballarat. Members of the commission expresed concern at the possible pollution of the creek by this drainage and its possible harmful effect on stock. This decision may prevent the operation of the straw pulp section of the works, causing the company to build its own purifying section.

Australian Paper Mills

Thousands of pounds worth of recently imported Canadian and American wood pulp sheets, timber waiting to be pulped, straw and wastepaper in thousands of bales were lost when a fire broke out at the Australian Paper Mills at Matraville, N.S.W., recently. This loss will be felt by the whole of the Australian industry in view of the already existing shortage of these materials caused by the dollar shortage.

New Zealand Forest Products, Ltd.

New Zealand Forest Products, Ltd. plans to spend from £8,000,000 to £10,000,000 on large-scale development of manufactures within the next 15 to 20 years.

One aim is to supply Australia's needs in long-fibered pulp for use in making newsprint and wrapping papers.

About 60,000 acres of pine forests have been set aside to feed the following industries: Existing board mills to be enlarged by 50 per cent; a chemical pulp mill with a capacity of 20,000 tons a year to be erected; output of sawmills to be increased from 13,000,000 to 60,000,000 feet of sawn timber a year; a draft paper mill with 10,000 tons annual capacity to be built; multiwall bags for carrying cement and superphosphate and fiber containers for packing to be made.

Expansion is to be carried out in progressive stages. The first stage will be financed by a recent £1,250,000 debenture issue plus reserves and is expected to be completed by 1951.

Australian Newsprint Imports in February

Figues of Australian newsprint imports in February, just released, show the big expected drop caused by newsprint restrictions on account of the dollar shortage. Imports were: Rolls—3,412 tons valued at £A96,493 (January: 495 tons valued at £A16,731). This represents a total drop of 13,591 tons in comparison with February last year.

Australian Paper Manufacturers Company, Ltd.

E. Telford Simpson of Sydney has been appointed acting chairman during the absence abroad of Sir Norman Brookes.

Sir Herbert Gepp, retiring managing director, has returned to Australia after having spent practically a year in intensive study overseas of the pulp and paper industry and associated industries. His investigations took him to Egypt, Turkey, Scandinavia, England, Scotland, Switzerland, Holland, Northern Germany and Northern America. In an interview with *Newspaper News* he dealt among other matters with the paper position and said: "The newsprint position is very tight in all countries except the United States and Canada, and even there I found some shortage, although not serious. The whole world paper position is out of balance, as instanced by the fact that in 1947 the United States used 350 lb. of paper and board per head of population while Great Britain struggled along on 55 lb. per head of population."

Australian Newsprint Mills, Ltd.

S. L. Kessel, managing director, has left Australia by air for the United States, Canada, and England. He will make final arrangements on the specifications and ordering of the machinery being bought for the company's £3,000,000 expansion program.

Pacific Paper Sales Pty., Ltd.

Cyril D. Colling, director and sales manager left Australia in April by Pan American Clipper for North America from where he will go to England and the Continent, returning to Australia by the end of the year.

▼

MARATHON MODERNIZATION AT MENOMINEE INCLUDES NEW YANKEE FOURDRINIER

A modernization and enlargement program has been completed at the Menominee, Michigan, plant of Marathon Corporation (Menasha, Wis.). Principal addition was the installation of a new Yankee fourdrinier paper machine for the manufacture of Waxtex. Installation of other new equipment, including supercalender stacks, brings the entire Waxtex manufacturing operation, from pulp to finished product, under a single roof.

The fourdrinier machine at Menominee has been completely rebuilt and modernized by the installation of a new wet end, additional dryers, and other improvements, making possible increased production and improved quality of the heavy weight papers and paperboards manufactured on this machine.

All stock preparation equipment at the Menominee plant has been completely modernized. Three hydrapulpers, additional refining equipment, new screens and stock chests, will provide the necessary capacity to furnish properly prepared pulp for the stepped-up paper machine capacity. A new warehouse is being built to furnish 38,000 square feet of pulp storage capacity.

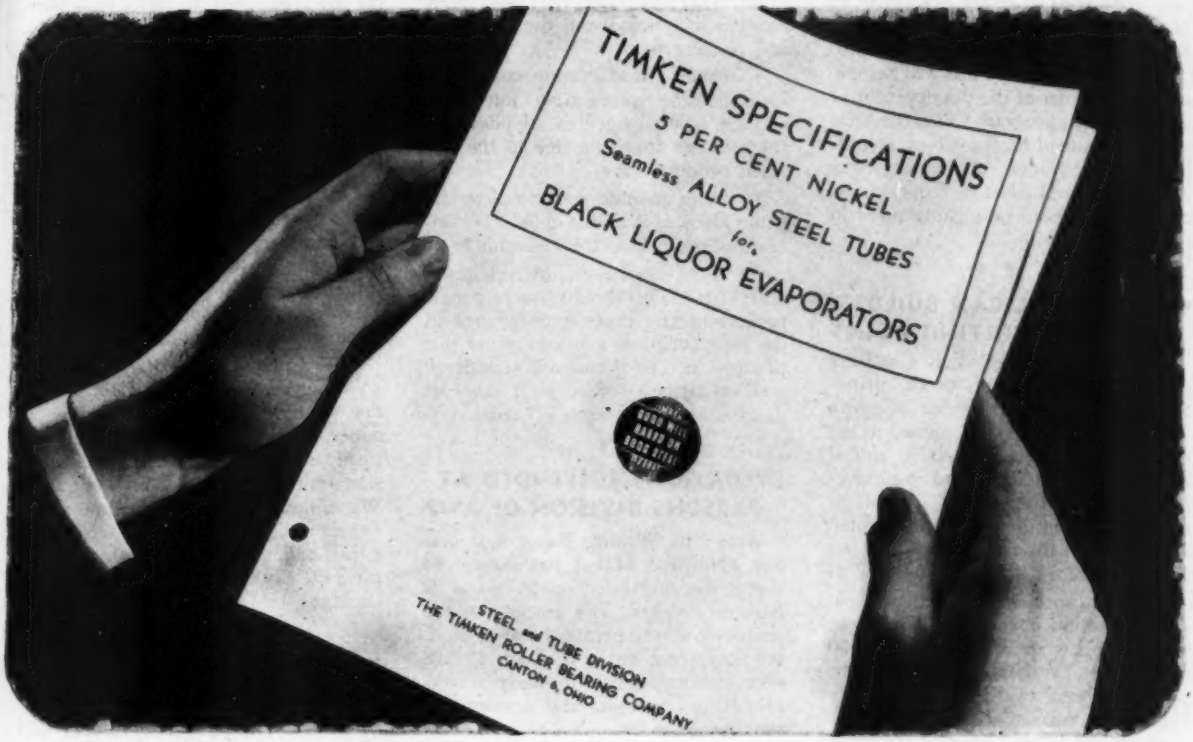
▼

NEW ZEALAND POTENTIAL PAPER SUPPLY SURVEYED BY RUST ENG. COMPANY

Building of mills for the production of newsprint and bleached sulphate pulp products from the vast exotic timber resources of New Zealand has been found to be economic, according to a survey just completed by The Rust Engineering Company, Pittsburgh.

The Rust organization was appointed consulting engineer by the Dominion government to make the study. Rust engineers, who recently conducted investigations in New Zealand, found the development of mills would be feasible commercially for the manufacture of newsprint and writing paper, groundwood and bleached sulphate pulp. A detailed report is being prepared which will cover all phases of manufacture and operation of the proposed facilities.

Results of the investigation have



You buy with your eyes open when you buy Timken® evaporator tubes

THERE'S no guess work involved when you buy Timken 5% nickel tubes for black liquor evaporators. With 19 years of experience in producing tubing for the process industries, Timken metallurgists have prepared specifications covering every requirement for seamless tubes used in black liquor evaporator service.

These specifications tell you exactly what you get when you buy Timken 5% nickel tubes. They cover chemical composition, physical properties, tolerances and inspection methods. Available in printed form, these specifications have been used by leading pulp mill operators for many years.

By meeting these specifications to a "T", Timken 5% nickel tubes give you maximum tube life per dollar invested. They help you cut the cost of black liquor corrosion three ways: downtime is reduced, tube replacement costs lowered and tube sheet wear minimized.

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YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

been confirmed in an announcement in New Zealand by Minister of State Forests Clarence Skinner. The proposed pulp and paper mills will become an intergral part of the development of the forestation program which the Ministry has planned for the future, according to Mr. Skinner. At present New Zealand imports all of its requirements of the products to be manufactured in the proposed mills.

▼

CONTINENTAL CAN BUILDS NEW CONVERTING PLANT

A new Continental Can Company paper converting plant for the manufacture of "Leverpak" fiber shipping drums is now under construction in the county of St. Louis, Missouri, and is expected to be finished and in production by February 1, 1949. This will be the fourth Continental plant devoted exclusively to the manufacture of fiber shipping drums.

Designed specifically for efficient paper conversion operations, the factory will comprise approximately 200,000 square feet. A contract to erect the plant has been awarded to the Fruin-Colnon Company of St. Louis, and grading and foundation work is under way. The manufacture of equipment for the new plant has been under construction for many months and will be ready for delivery and installation as soon as the new building is completed.

▼

ROY FERGUSON SPEAKS AT SECURITY ANALYSIS GROUP

An address by Roy K. Ferguson, president of St. Regis Paper Company, before the New York Society of Security Analysis gave a comprehensive resume of the situation of the American paper industry covering the price, labor and raw material supply situation.

Mr. Ferguson said the largest company in the industry had settled on an 11 cent wage increase for its northern mills, and St. Regis has concluded negotiations with the paper mill unions on the same basis in its northern area. He said that prices have apparently leveled off and the wage increases will probably be absorbed by the manufacturers.

Mr. Ferguson in summarizing the present day conditions said that the paper industry is destined to expand further in the next ten years, but will cease to be a feast or famine industry. The factors entering into the changed conditions he listed as follows:

1. Only limited stands of timber are currently available.

2. The cost of constructing new integrated mills has doubled compared with pre-war costs.

3. Many important uses have been developed, especially in the wrapping and packing field.

4. Paper manufacturing companies have become increasingly integrated and are now engaged in all phases of the business from the tree to the finished product.

5. More accurate and complete statistics are now available on which manufacturers can base their planning.

As to St. Regis itself, Mr. Ferguson said 1948 sales should reach a new peak, assuming there is no change in the basic situation, earnings might justify an increased common dividend, now 60 cents per year, by a year-end distribution of an extra 40 cents.

▼

OPERATIONS SUSPENDED AT PARSONS DIVISION OF AWP

American Writing Paper Corporation (Holyoke, Mass.) has announced that it has suspended operations at its Parsons division. The purpose of the shutdown was to permit the more modern equipment of the company to take over the production formerly accomplished on the older and smaller Parsons machines.

This two-machine mill, built in 1853 by J. C. Parsons and absorbed into the American Writing Paper organization at the turn of the century, employed 75 persons, many of whom will be employed elsewhere in the company's mills. Matthew Horgan had been superintendent of the division.

No announcement has been made as to the company's plans for disposal of the real estate, machinery, and the valuable water power rights at the head of the Holyoke Water Power Company's canal system.

▼

SMITH PAPER, INC., USES NEW TECHNIQUE TO MAKE COATED CONDENSER PAPER

Coated condenser paper will be manufactured by Smith Paper, Inc. (Lee, Mass.), through a new technique developed by National Research Corporation. An exclusive licensing arrangement has been made by the two corporations whereby metallized paper for use in electrical condensers will be manufactured in the United States by the Smith company under present and future developments of the research organization.

By this new method, thin condenser paper is continuously coated in a vacuum chamber with a zinc vapor which condenses in a thin film on the surface of the paper. After treatment the coated paper requires only cutting and rolling to form condensers for electronic and electrical use, thus eliminating the usual need for metal foil. Both the weight and the size of condensers of this type are reduced approximately 40 per cent.

▼

OREGON AND WASH. MILLS DAMAGED BY FLOOD WATERS

Costly damage to some pulp and paper producing plants and inconvenience to others resulted when waters of the Columbia River and its tributaries spilled over their banks in the late May-early June flood in Oregon and Washington.

The Columbia River Paper Mill (Vancouver, Wash.) had water so high that workmen were able to row at paper machine height in inspecting the plant. The Weyerhaeuser pulp division mill was closed at Longview, Washington, when logs became short. Other mills at Camas and elsewhere either had trouble getting logs, shipping their output or with actual water damage.

▼

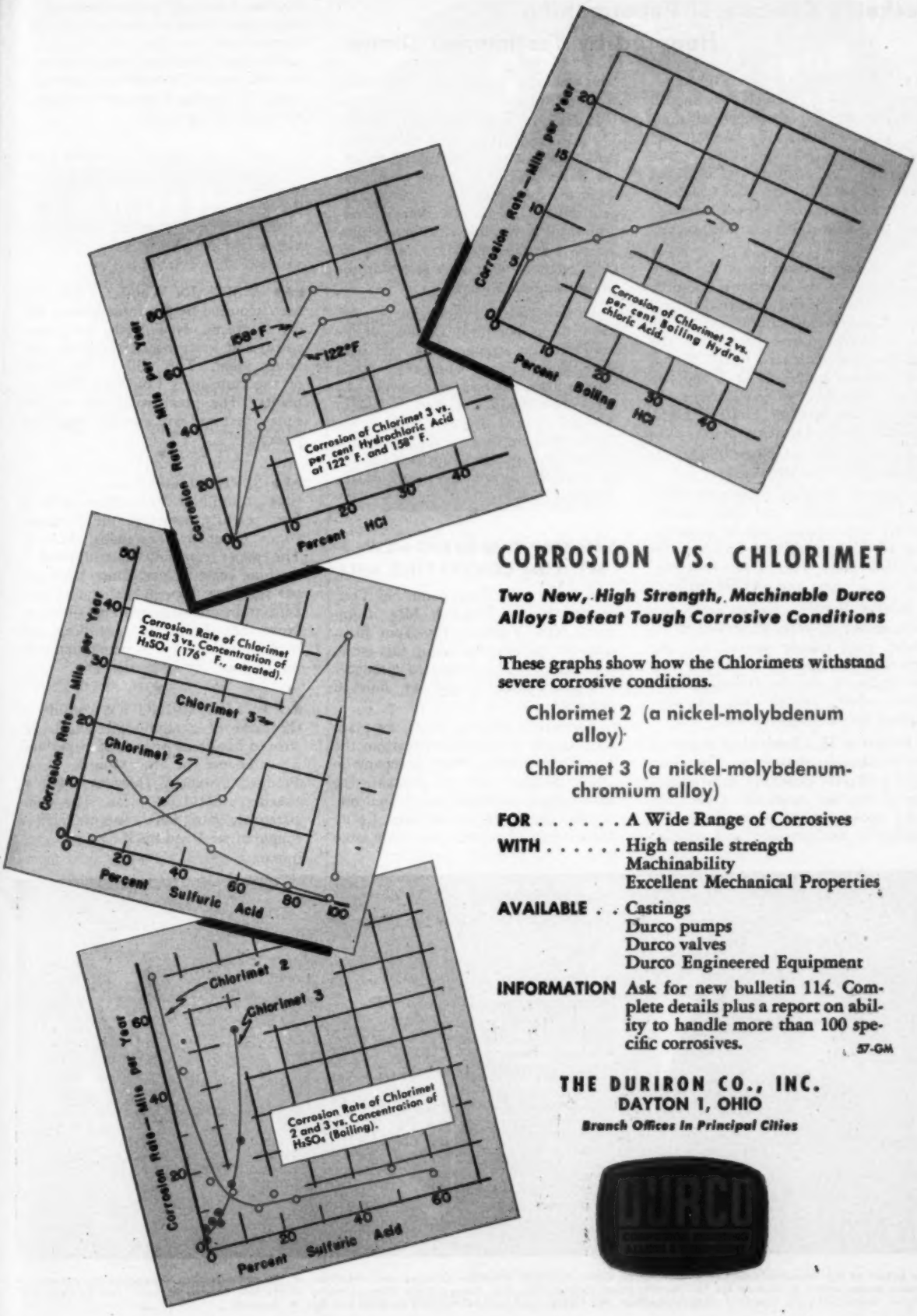
EVEREST AND ASSOCIATES BUY WAUSAU PAPER MILLS

D. C. Everest, prominent paper mill executive, and a group of associates purchased the Wausau Paper Mills at Brokaw, Wisconsin, May 18. They plan to continue production of the same line of products, with the probable investment in additional equipment and improvement of manufacturing conditions, particularly in the bleach plant.

Mr. Everest and his associates became interested in the company after investigating its possibilities. During the latter part of 1947 an eastern concern had obtained an option for the purchase of the stock of the company, which also involved the payment of the notes issued to the stockholders for money used to rehabilitate the property, particularly following the floods of 1938 and 1941. The option was not exercised within the time limit and a further extension expired March 7, 1948. As a result of their investigation, the Everest group secured an extension of the option under the original terms.

The officers of the new company are: D. C. Everest, president; Eugene G. Ingalls, vice president and manager; Harold R. Knott, vice president and sales manager; and Glenn Stevens, secretary-treasurer. The board of directors will consist of the officers, together with the following: N. F. Becker, D. B. Smith, and F. J. Dvorak.

Chester W. Cone will be in charge of woods operations and wood purchases. R. V. Perry and John Wood will continue in charge of the Arrow Timber Company, a wholly-owned subsidiary in Calstock, Ontario.


Corrosion Rate—Mils per Year
158° F
122° F
Corrosion of Chlorimet 3 vs. per cent Hydrochloric Acid at 122° F. and 158° F.
Percent HCl
Corrosion of Chlorimet 2 vs. per cent Boiling Hydrochloric Acid.
Percent Boiling HCl
Corrosion Rate of Chlorimet 2 and 3 vs. Concentration of H_2SO_4 (176° F., aerated).
Chlorimet 3
Chlorimet 2
Percent Sulfuric Acid
Corrosion Rate of Chlorimet 2 and 3 vs. Concentration of H_2SO_4 (Boiling).

CORROSION VS. CHLORIMET

Two New, High Strength, Machinable Durco Alloys Defeat Tough Corrosive Conditions

These graphs show how the Chlorimets withstand severe corrosive conditions.

Chlorimet 2 (a nickel-molybdenum alloy)

Chlorimet 3 (a nickel-molybdenum-chromium alloy)

FOR . . . . . A Wide Range of Corrosives

WITH . . . . . High tensile strength
Machinability
Excellent Mechanical Properties

AVAILABLE . . Castings
Durco pumps
Durco valves
Durco Engineered Equipment

INFORMATION Ask for new bulletin 114. Complete details plus a report on ability to handle more than 100 specific corrosives.

57-GM

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DURCO

Beckett's Century of Papermaking Honored by Testimonial Dinner

▶▶▶ ONE HUNDRED YEARS of papermaking was completed last month by The Beckett Paper Company, Hamilton, Ohio. Outstanding among one hundredth anniversaries is the fact that throughout the century, the mill has been on the same site, and has been owned and operated, without interruption, by the members of the Beckett family.

Under the sponsorship of the board of directors of the Hamilton Chamber of Commerce, fellow industrialists and civic associates gave a testimonial dinner to the officers and directors of The Beckett Paper Company in the Woodrow Wilson Junior High School on June 8. The Hon. Robert M. Sohngen, Judge of the Supreme Court of Ohio, presided as toastmaster.

Speakers who addressed the guests following the dinner were:

Frank K. Vaughn, prominent Hamilton businessman and civic leader, lauded the company for its contribution to the growth and prosperity of the community, for its generous support of all civic and welfare projects.

Jerome Zettler, Beckett employee with nearly 20 years of service to his credit, paid tribute to the fair and generous dealings of the company with its employees, and the friendly, family spirit which always has prevailed throughout the organization.

Frederick H. Chatfield, manager of the Pittsburgh division of The Chatfield & Woods Company, great grandson of the first customer of the company, spoke for the paper trade. He expressed the pleasure and satisfaction resulting from long association with the company.

Reuben B. Robertson, president of The Champion Paper and Fibre Company, and past president of the American Paper and Pulp Association, was the main speaker of the evening. He paid tribute for the "phenomenal record" made by the Beckett company during its one hundred years, and spoke of its relations with other factors in the papermaking industry.

As a tangible expression of appreciation, Cyrus J. Fitton, chairman of the committee on arrangements, presented The Beckett Paper Company with a bronze plaque, which was accepted by Mrs. Mary Willikin Beckett, widow of the late Thomas Beckett. He was the son of William Beckett, founder of the company. Guy Hamilton Beckett, son of Thomas, is now president of the company.

▼

SAN-NAP-PAK OPENS NEW MT. TOM CONVERTING MILL

A new converting plant has been opened by San-Nap-Pak Mfg. Company, New York, at Mt. Tom Junction, Massachusetts, making this establishment a fully integrated producer of tissues from wood to finished product.

Formerly a pulp mill only, the plant was bought by San-Nap-Pak from the Mt. Tom Sulphite Pulp Company in 1947. Shortly after the purchase the new owner installed two paper machines. The capacity is 60 tons of pulp and 10 tons of paper a day. Pulp from the Mt. Tom mill is also supplied to other paper mills of the San-Nap-Pak organization.

The new converting unit is housed in a building 25 feet wide and 257 feet long. It employed five men and ten women at its opening.

BRIEFS

▶▶▶ A SITE IN Wooster, Ohio, has been acquired by the International Paper Company, New York, for a new corrugated kraft board shipping container plant. This will be the ninth of the company's Container Division plants. The plant will have 80,000 square feet and will employ about 200 persons.

▼

▶▶▶ SEVERAL OFFICIALS from the Chicago and New York offices of Time Inc., recently inspected the Escanaba Paper Company (Escanaba, Mich.). The paper company has supplied a machine coated glossy finish book paper for Time Inc., publisher of *Time*, *Life*, and *Fortune* magazines, since last November. Production, handling, and quality of the paper were studied during the one-day inspection trip.

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▶▶▶ LIGHTNING was considered the cause of a raging fire which destroyed hundreds of tons of paper and a warehouse of the Monroe Paper Products Company (Monroe, Mich.), causing a $100,000 loss. The comparatively new warehouse was left a tangle of steel and brick.

On behalf of the Hamilton Chamber of Commerce, Cyrus J. Fitton, Hamilton attorney and chairman of the committee on arrangements, presents a bronze plaque which is received for The Beckett Paper Company by Mrs. Mary Millikin Beckett, widow of the late Thomas Beckett. Left to right are: Guy H. Beckett, Mr. Fitton, Mrs. Beckett, William Beckett and Dan M. Beckett

▶▶▶ HOUSING FOR an extension to one of its machines which is being equipped with additional dryers is under construction at the Newton Paper Company (Holyoke, Mass.). The addition will cost $13,200.

▼

▶▶▶ HIGH BIDDER for about 730 acres of timber in the Olympic National Forest of Washington when bids were opened in May was the Rayonier, Inc. (Hoquiam, Wash.), with an offer of $111,200. The tract contains Douglas fir, western red cedar, Pacific silver fir, and western hemlock.

▼

▶▶▶ A MODERN PAPER MILL is being planned by the largest paper manufacturing firm in the Union of South Africa to be erected on the Tugela River in Zululand, north of Durban. This firm also has a factory producing paper and paperboard at Geduld (near Springs) in the Johannesburg area. (Taken from *Foreign Commerce Weekly*, April 10, 1948.)

▼

▶▶▶ PULPWOOD TOWING across Lake Superior from northern Minnesota and Canadian waters was started by the Consolidated Water Power & Paper Company (Wisconsin Rapids, Wis.) the early part of June. About 50,000 cords of wood were towed by company tugs for loading at Ashland, Wisconsin, and shipment by rail to its own mills and to other companies.

▼

▶▶▶ IN A RECENT FIRE the American Pulp and Paper Company (Filer City, Mich.) lost about 5,000 cords of wood. Eleven pieces of equipment from five neighboring communities were required to extinguish the fire. None of the company buildings were burned, nor was the firm's $1,000,000 stock harmed by the fire.

▼

▶▶▶ THE LUMBER MILLS and other facilities owned by Lester S. Crane at Whitneyville, Maine, have been acquired by the St. Regis Paper Company, of New York City.

▼

▶▶▶ A COMPLETE SHUTDOWN has been announced by the United Board & Carton Corporation (formerly United Paperboard Company), New York, for its plant at Victory Mills, New York, which had been operating on a part-time basis for the past several months. The company's plant at Thomson, New York, which manufactures carton material, will not be affected by the closing.

with Dings High Intensity Double Pole Rectangular Magnet

Here's the answer to tramp iron problems! This powerful electromagnet, installed in pulp lines, prevents tramp iron damage to pumps, jordans, screens or other equipment—before it causes costly shutdowns. Dings double pole design produces a deeply penetrating and evenly distributed magnetic field—most powerful magnet available for the job . . . it's a real tramp iron barrier. Simple to install . . . low operating cost . . . negligible maintenance because of no moving parts . . . powerful magnet coils enclosed in waterproof case . . . available in various sizes. These magnets are installed face up in the pulp lines with the pipe flared out across the magnet face and an access plate provided to permit easy removal of accumulated iron. If tramp iron is a problem in your mill, write to Dings today.

Outstanding Features:

- **High intensity double magnetic pole design—deep penetration; no "dead spots"**
- **Easy to install**
- **Negligible current consumption**
- **Trouble-free. No moving parts to get out of order**
- **Waterproof case**

Typical Examples of What These Magnets Can Do For You!

- **A large southern pulp mill** was losing an average of two pump impellers per week prior to installing Dings rectangular magnets—causing big losses in time and tonnage due to shutdowns. Since using Dings magnets, not one pulp impeller has been destroyed or any production time lost due to tramp iron getting into pumps or other machinery.
- **Paper company** removes 60 to 70 lbs. of tramp iron every 24 hours!

Dings

"HIGH INTENSITY"

Separation Headquarters Since 1899

DINGS MAGNETIC SEPARATOR CO., 4762 W. McGeogh Ave., Milwaukee 14, Wis.

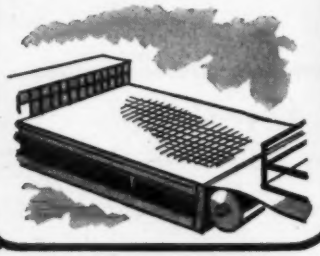
Men work long and well at Lindsay...

Recently two "oldsters" retired from Lindsay employ. One had worked here for 43½ years; the other, for 42½ years. During a ceremony held in their honor at the end of their service, some interesting, if more or less whimsical, figures were concocted, among them the following:

1. They started with us in 1904 and 1905, when Theodore Roosevelt (T.R.) was president of these United States.

2. Together they spent 86 years on the job. That goes all the way back to 1862—to Civil War days and "states' rights".

3. "Sticking to it" for those 86 years, our two men could have woven a total of something like 6500 Fourdrinier wires.



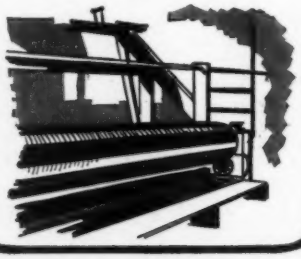
4. Those 6500 wires would keep one paper machine running about 540 years—back to 1408 and days of religious awakenings in Europe.

5. On 6500 wires, 5,000,000 tons of paper could be made, or about 1/4 of all the paper production for the United States in 1947.

6. In 86 years our two men would have walked 172,880 miles while on the job, or about seven times around the world.

7. They would have used approximately 1,300,000 miles of strand wire, which would reach to the moon more than five times.

8. Operating steadily, the bobbins on their looms would have given out and been changed not less than 3,000,000 times.



9. Walking up and down, following the shuttle, our two men would probably have worn out something like 344 pairs of shoes.

THE LINDSAY WIRE WEAVING COMPANY

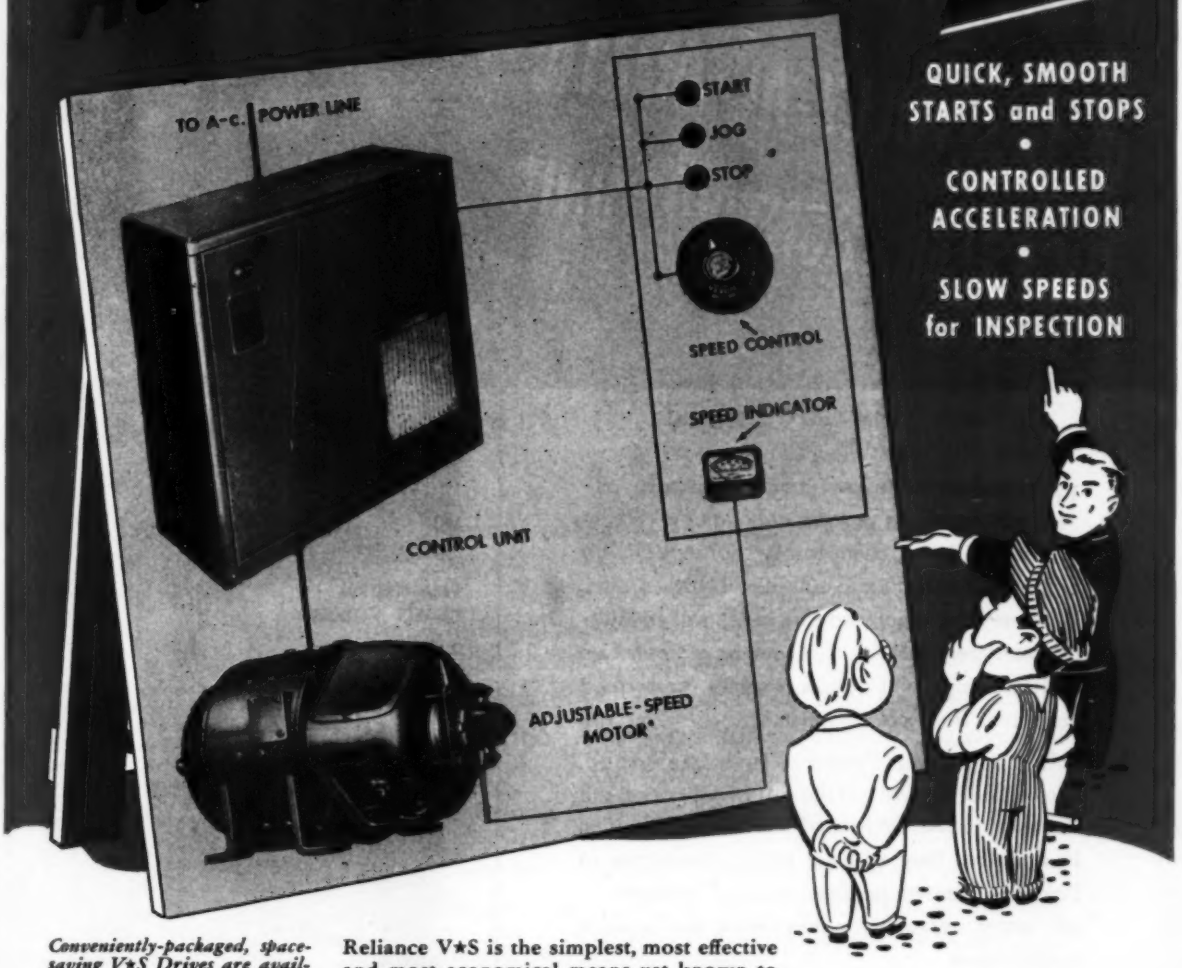
Serving the Paper Industry Since 1903

14001-14299 ASPINWALL AVENUE • CLEVELAND 10, OHIO

Lindsay **WIRES**

FOR PAPER MILLS

ADJUSTABLE SPEEDS from A-c. Circuits and...



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp.

**Two or more motors may be operated simultaneously from a single Control Unit.*

RELIANCE V★S DRIVE

Reliance V★S is the simplest, most effective and most economical means yet known to industry of providing *Adjustable-speeds from A-c. Circuits.* And it's *All-electric!* V★S offers many operating features, including an infinite range of stepless speed changes—slow speeds for make-ready and inspection—controlled acceleration and deceleration—maintenance of proper tension for roll-fed materials. All V★S functions can be controlled automatically or manually, at the machine or from remote stations. For unlimited flexibility of machine operation—with savings that quickly pay for the installation—investigate V★S today. Write for *new* Bulletin 311.

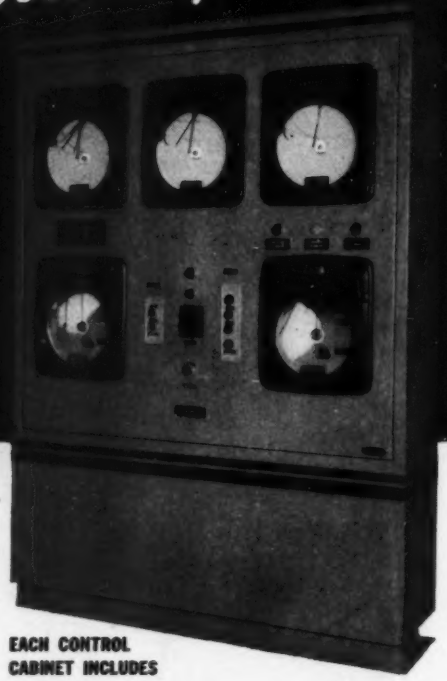
RELIANCE ELECTRIC & ENGINEERING CO.
1078 Ivanhoe Road • Cleveland 10, Ohio

Appleton, Wis. • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Dallas • Denver • Detroit • Gary • Grand Rapids Greenville, S. C. • Houston • Kansas City • Knoxville • Little Rock • Los Angeles • Milwaukee • Minneapolis • New Orleans New York • Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Roanoke, Va. • Rockford • St. Louis • San Francisco • Seattle Syracuse • Tampa • Tulsa • Washington, D. C. • Mexico City, Mexico • Montreal, Canada • Sao Paulo, Brazil

RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

Weyerhaeuser gets *Advanced Engineering* in this FULLY-AUTOMATIC DIGESTER CONTROL UNIT



WEYERHAEUSER's new magnesium-base, sulphite cooking process at Longview, Washington will be completely controlled by highly efficient Foxboro units like the one shown. Digester heat input and gas relief will be automatically regulated so that cooking temperature and pressure will follow exactly prescribed schedules from start to finish.

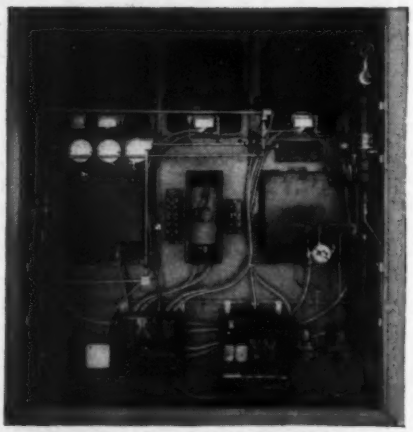
In specifying Foxboro Instrumentation, Weyerhaeuser will get the full benefit of all the latest and most advanced instrument features. In addition, they will get every advantage of Foxboro plant-engineered control cabinets... efficiency, versatility, convenience and modern appearance.

Foxboro engineered units are available for any type of sulphite or sulphate digesters. Get complete details... for closer control in pulp cooking. Write **The Foxboro Company, 158 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities.

• • •

EACH CONTROL CABINET INCLUDES

1. *Top Left*—2-pen DYNALOG temperature and pressure recorder.
2. *Top Center*—2-pen acid flow recorder.
3. *Top Right*—Totalizing steam flow recorder.
4. *Lower Left*—Cam schedule steaming controller.
5. *Lower Right*—Cam schedule relief pressure controller.



Rear View (doors open) shows efficiency of factory piping and wiring.

FOXBORO REG. U. S. PAT. OFF.

AUTOMATIC DIGESTER CONTROL

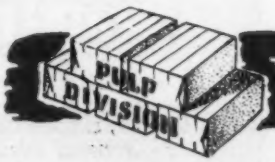
SEED TREE

PLEASE DO NOT CUT!

In the fall of 1941, the Weyerhaeuser Timber Company established the first officially designated "Tree Farm" near Alma and Montesano, Washington. To honor Charles H. Clemons, a pioneer logger in that section, it was named the "Clemons Tree Farm."

Today, seven short years later, "Tree Farming" has grown like a veritable Paul Bunyan. Over a thousand companies and individuals, owning some fourteen million acres of producing forest land, have pledged themselves under the Tree Farm program to manage and protect their woodlands for continuous production of commercial forest harvests.

The Weyerhaeuser organization, pioneer tree farmer, now operates eight tree farms. Its foresters are actively engaged in providing for the continuous production of tree crops. The Pulp Division, assured of an uninterrupted flow of West Coast pulpwood, is a reliable producer of bleached chemical woodpulp.



WEYERHAEUSER

SPECIALISTS

GET BETTER RESULTS

in music...

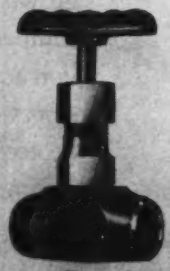
...and in VALVE MANUFACTURE

● A piccolo player may be a good musician but that does not mean he can play a violin. Each instrument requires a special technique in its handling. And so it is with corrosion-resistant valves, as compared with ordinary valves. Stainless steels and related alloys must be fabricated by very different methods from other metals. This is true at every stage in the manufacture of valves—from the foundry clear through to the assembly line.

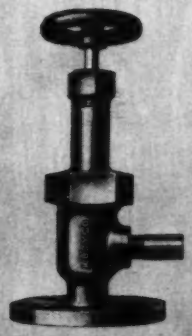
● Just as good musicians specialize in one instrument, so we specialize in one type of valve—that designed for maximum resistance to corrosion and contamination in pipe lines. And this specialization has given us a knowledge of the peculiar qualities of stainless steels and related alloys that enables us to produce the most efficient corrosion-resistant valves for our customers.

● One of our sales engineers would be glad to confer with you on your requirements.

Aloyco Globe Valve #311



Aloyco Needle Valve #40-N



Aloyco Sampling Valve #731 —flanged end

ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

More Consumers Need More Paper

▸▸▸ LAST YEAR, 145,350,000 men, women and children had a per capita of paper products of 340 pounds each, a total of 24,700,000 tons.

That is an all-time record high in paper supply to the consumers of this country. And yet, it is not enough to satisfy the constantly growing demand. In 1948, the population of the United States it is estimated will be 147,567,000, according to the known trend of increase in the paper industry adjusted to the increase of population, the per capita supply for 1948 should be 361 pounds of paper, a total of 26,689,000 tons.

But, there is an *if* to it!

We shall have 26,689,000 tons for the per capita consumption of 361 pounds each *if* the imports of papers from Canada and Europe are approximately the same volume as last year —which they probably will be—plus the *if* that the production of paper by the United States mills will increase from 21,029,000 tons to 23,113,000 tons—of that, there is some doubt.

The production of domestic mills would have to increase over 2,000,000 tons this year. That's a tough problem.

The total machine capacity in the United States for 1947 was 21,775,000 tons and the production was 21,029,000 tons, leaving only 746,000 tons of capacity surplus over production. The smallest surplus capacity in the history of the paper industry (save only the year 1900 when capacity surplus over production was 614,000 tons) represented a 20 per cent capacity surplus, whereas the 746,000-ton surplus in 1947 represents only a 3 per cent capacity surplus. This is the way it looks:

Year 1900	Tons
Capacity	2,782,000
Production	2,168,000
Capacity Surplus	614,000
Production to Capacity	80 per cent

Year 1947	Tons
Capacity	21,775,000
Production	21,029,000
Capacity Surplus	746,000
Production to Capacity	97 per cent

Here is a case where production is overtaking capacity, not demand. With demand crowding production, and production needling capacity, the answer naturally would be *increase machine capacity*. That is what will eventuate. But it is going to be a slow process after this year to increase production of paper. The increase in production already is limited to the increase in capacity.

The 1947 production ratio of 97 per cent is the climax to seven years of forced draught production. The war demand was great, but the peace demand is greater and will continue so for a long time to come—at least so long as the tremendous increase in added consumers continues at the rate it has been increasing during this 1940 to 1950 decade.

The paper industry makes paper for people. More people require more paper, but it is impossible to supply them with more than the machine capacity of the industry will permit.

The 97 per cent ratio of production to capacity cannot be expected to stand. In the meantime, the only way in which consumers may hope to receive increased supply of paper products is from yearly increases of machine capacity of the mills in this country.

A Foward Step

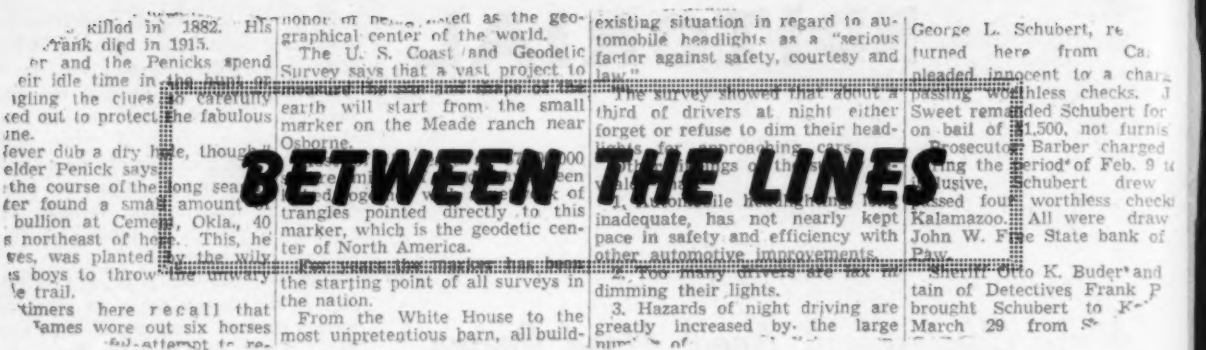
▸▸▸ THE GROWTH and expansion of the pulp and paper industry, evidenced by the magnitude of statistics that come from its various associations, have been brought about through an exchange of ideas and the distribution of those ideas to all who can use them.

Publishers of the periodicals serving this industry ever have been alert and solicitous in their efforts to co-operate with the organized associations of this industry. These efforts often have been made difficult, however, because of an inability to procure advance copies of papers scheduled for presentation at meetings and conventions.

A forward step was inaugurated this year by the American Pulp and Paper Mill Superintendents Association when the official representatives of the publications serving the pulp and paper manufacturing industry were invited to a Press Breakfast. Five publications of this industry were represented at the breakfast which was served in the Pan-American Room of the Roosevelt Hotel, New Orleans, Louisiana, on Wednesday, May 19, just before the opening of the Association's Twenty-Eighth Annual Convention.

Associate Secretary-Treasurer Harry E. Weston had procured and prepared copies of a majority of the papers on the program for the following three days. Copies of these papers as well as copies of prepared addresses and reports were given to each representative. As a group, the recipients expressed warm appreciation of this assistance.

THE PAPER INDUSTRY AND PAPER WORLD makes this sincere editorial acknowledgment of what it considers a forward and progressive step, which it is hoped will become a precedent for all future conventions of the industry.



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Frank died in 1915.
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timers here recall that
ames wore out six horses
ful attempt to re-

honor of being named as the geographical center of the world.
The U. S. Coast and Geodetic Survey says that a vast project to measure the shape of the earth will start from the small marker on the Meade ranch near Osborne.
[illegible] 000
[illegible] been
[illegible] of
triangles pointed directly to this marker, which is the geodetic center of North America.
The survey, the markers say, began the starting point of all surveys in the nation.
From the White House to the most unpretentious barn, all build-

existing situation in regard to automobile headlights as a "serious factor against safety, courtesy and law."
The survey showed that about a third of drivers at night either forget or refuse to dim their headlights for approaching [illegible]
[illegible] lights of the [illegible]
[illegible] automobile headlighting [illegible] inadequate, has not nearly kept pace in safety and efficiency with other automotive improvements.
2. Too many drivers are lax in dimming their lights.
3. Hazards of night driving are greatly increased by the large num[illegible]

George L. Schubert, re
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March 29 from S

BETWEEN THE LINES

One Lesson We Haven't Learned

▶▶▶ THE AIR WAS MURKY throughout the midwest the other day —one of the first really warm days. The forecast was for fair and warmer, but the air was hazy and Old Sol looked more like a harvest moon. It wasn't the usual fog off the lake and by the calendar Indian summer was a long way ahead.

The next morning a meteorologist came on the air and explained the phenomenon. He said that a great forest fire was raging throughout Northern Ontario and that the wind had borne smoke over most of the Great Lakes region. Reports were that ashes had fallen around two of the lakes. An air pilot reported signs of the smoke as high as 14,000 feet.

Truly did a great man write "How far that little candle throws his beam." But the light shed by a little candle—though typifying cheer and hope—is feeble by comparison and is far outdistanced by the spark from a match or the unextinguished camp fire left by hunters. Must we be reminded constantly that the time and money expended by organized groups to protect the earth's greatest crop, even the lives of men, are most vital among movements conducted for the benefit of humanity?

We call ourselves good Americans; some of us take great pride in knowing the history of our country backwards, but we stop at one point. We might go a bit farther and accept the fact that although our forefathers settled this great land, the first Americans even now might shame us for some of the things we do—and some we don't do. The Indian hunted game for his food. He had no matches, but sparked his own camp fires. And yet the redskins left this country clothed with majestic growths of valuable forests equaling the fabulous wealth of an empire.

Yes, we Americans of today think we are super-something because we have become an intelligentsia. We have learned to budget costs; we live by our wits, so to speak, and we accumulate puny possessions which we call "wealth."

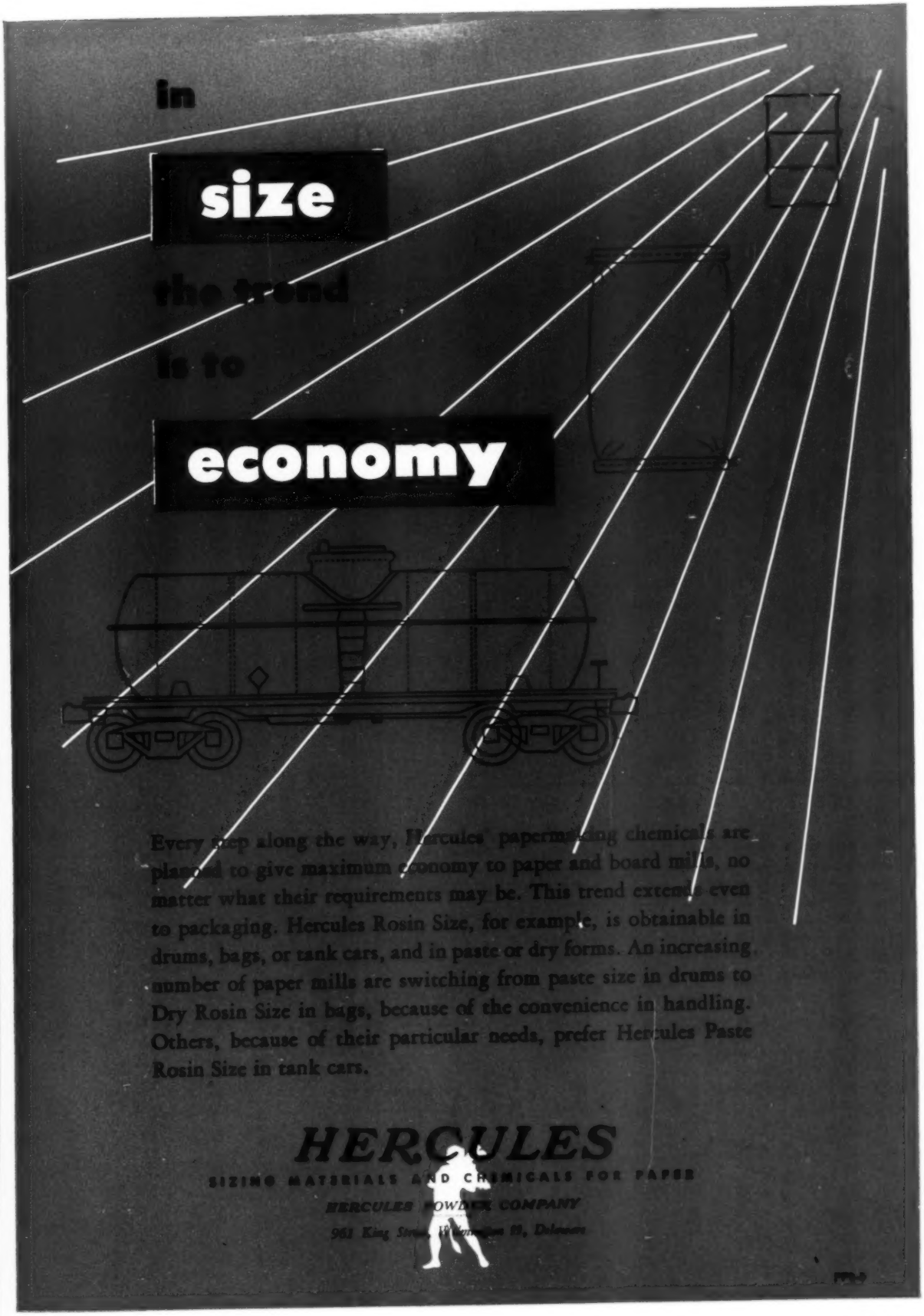
Economy is the one class in which we have failed. We took a pint-size test in this subject during the war when we saved fat, turned in our tin cans, gathered scrap metal, rubber and wastepaper, and ate only as much food as we needed. But with the war over and peace declared, we forget some items are still on the scarce list. Paper mills need wastepaper now as much as they did during wartime. Fats are still scarce and bring a good price. . . . But, of course, the war is over. And even the small sacrifices we endured as hardships only penetrated the outer skin. We have had too much of the earth's goodness; abundance has made of us spoiled children.

One of the largest steel companies estimates there is an average of 500 pounds of scrap on every farm in America. And one ton of good scrap will make almost a ton of steel. Millions of tons of steel are needed. Most of us need and want a new automobile. All right, get the corners cleaned out and see how many pounds you can furnish as a down payment on that car.

The wealth of wastepaper made the front page the day before this was written. Long after a fire in an ancient Washington (D.C.) stable, a sculptor dug out the remainder of a pile of unburned papers which proved a treasure of inestimable value. For the rubbish contained many colonial documents of great historical importance. It is said that if a subscriber needs a telephone book in Berlin, he must turn in 17 pounds of old newspapers, books, etc., in addition to his old directory (Cf. *The Log*, published by The Champion Paper and Fibre Company).

It's about time we realized the importance of our lesson on economy; about time we learned to guard our resources. Let us not be "vanishing Americans."

—By Bessemer



Every step along the way, Hercules papermaking chemicals are planned to give maximum economy to paper and board mills, no matter what their requirements may be. This trend extends even to packaging. Hercules Rosin Size, for example, is obtainable in drums, bags, or tank cars, and in paste or dry forms. An increasing number of paper mills are switching from paste size in drums to Dry Rosin Size in bags, because of the convenience in handling. Others, because of their particular needs, prefer Hercules Paste Rosin Size in tank cars.

HERCULES

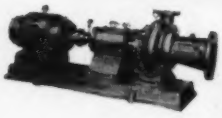
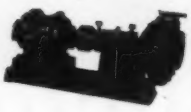
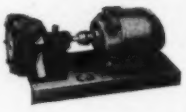
SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY

963 King Street, Wilmington 99, Delaware

Let's Take Up YOUR Pumping Problems

Worthington Solves Them with the Specific Pump for Every Paper Processing Job

Questions	Answers
What's the best stock pump for sulphate, sulphite, soda, ground wood, waste paper, coffee liners, etc.?	 An FP pump will handle them at capacities up to 6,000 GPM, heads to 200 ft. and consistencies to 7%.
How about a good white water or fan pump?	Use L and LA pumps for all heads and capacities with consistencies up to 1%.
What's a reliable pump for green or white liquor?	 A CG Worthite is the ideal pump for dissolving-tanks, transfer and causticizing.
Handling black liquor is always a big problem at our mill. What pumps are best for its various phases?	For furnace feed of black liquor with suspended coke there's nothing like a CH pump.
	For circulation and transfer of concentrated black liquor at viscosities up to 10,000 ssu, use a CL.
	 Black liquor pumping for multiple effect evaporators is best handled with a CG Worthite pump.

The Worthington Centrifugal Pumps shown here are your best answers for the general run of paper processing needs. Acids, bleaches, alum, sizes and other abrasive, corrosive, viscous or volatile liquids are handled efficiently and economically by these and other pumps in the world's most complete line.

Is Your Problem Different?

But perhaps you've met with some entirely new difficulty — either in processing or such general mill service as boiler feed, condensate or fire protection.

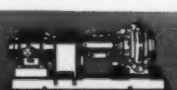
Whatever it may be, take advantage of the longest, most comprehensive experience in the field. Call our nearest district office or write to us direct. You'll get the prompt, expert cooperation on any pumping problem — no matter how unusual or complicated — that proves *there's more worth in Worthington.*

Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

WORTHINGTON

C7-3

THE WORLD'S LARGEST MANUFACTURER OF PUMPS



CENTRIFUGAL STOCK PUMPS Type FP. Handle all kinds of stock up to 7% consistency. 4 sizes. Capacities up to 6000 GPM; heads up to 200 ft.; speeds up to 1200 RPM.

GENERAL PURPOSE PUMPS Type CF. Open impeller. Single stage. Sizes 1" to 4". Capacities up to 1000 GPM; heads up to 130 ft.; speeds up to 2475 RPM.

BOILER FEED PUMPS Type UB-2. 7 sizes. Capacities up to 1500 GPM; heads up to 1000 ft.; speeds up to 3600 RPM.

YOU GET MORE WITH A *Sutherland*

THAN JUST A REFINER

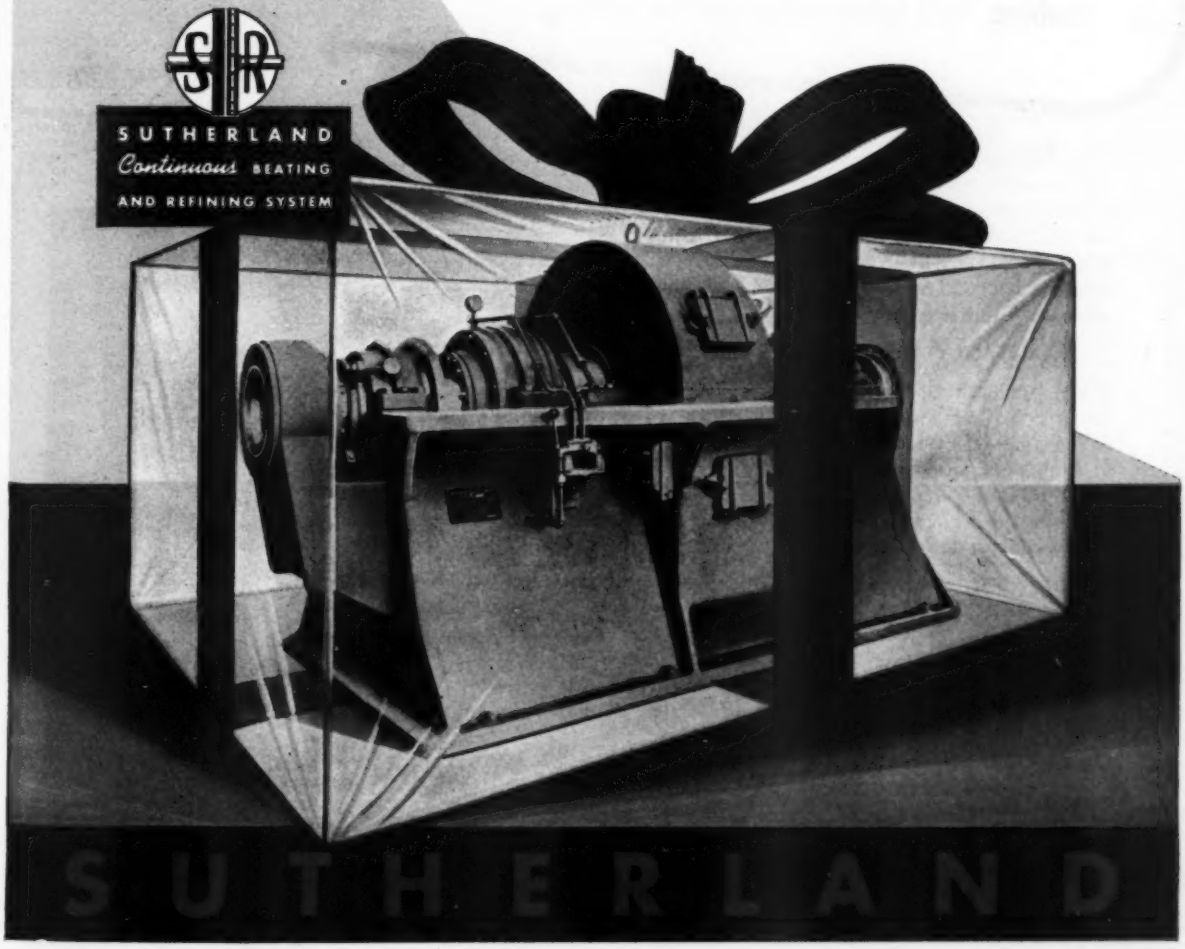
When you purchase Sutherland Continuous Beaters and Refiners or the Sutherland High Yield Sulphate Process, you get the necessary engineering service to plan the layout for the best results in your mill, plus technicians at the start-up to properly train your operations and maintenance personnel; PLUS continuous service to keep your operations abreast of new Sutherland developments. . . . Quick attainment of performance guarantees is easily accomplished by your regular operating crews; in addition, your satisfaction with the entire installation is guaranteed. We will not accept any orders unless we are sure the results will add to the good reputation we have been building for twelve years. . . . Regardless of whether you make bond, book, news, kraft, tissue or board, your conditions will be improved with Sutherland Refiners operating ahead of your papermachines. . . . May we send you our new catalog, or may we answer your specific questions by mail or a visit?

SUTHERLAND REFINER CORPORATION

TRENTON, NEW JERSEY • *Manufactured in the United States by Valley Iron Works Co., Appleton, Wis.*

SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P. Q.

Manufactured in Canada by The John Bertram & Sons Co., Ltd., Dundas, Ontario



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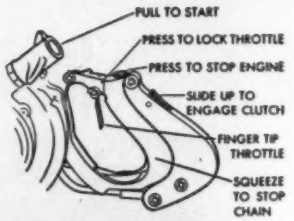

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THE PAPER INDUSTRY
and PAPER WORLD
JUNE 1948

Paper Research and Technology at the National Bureau of Standards

BOURDON W. SCRIBNER

This paper summarizes the activities of the National Bureau of Standards pertaining to paper, various other documentary materials such as photographic film, cellulose acetate sheeting and ink, and fiberboards. Brief accounts are given in the various fields of work which comprise papermaking materials and processes, testing methods, use of paper in printing, preservation of records, and properties and specifications. A bibliography of 193 references to publications by members of the Bureau's staff is included.

IN THE EARLY DAYS of the National Bureau of Standards (1901-1911) problems relating to paper and related materials were undertaken. Although the manufacture of paper was at that time, as it still is, one of the largest of the industries of this country, there were no recognized standard methods or instruments for testing paper, and published information on the physical and chemical properties of paper and papermaking materials, and on the elements which influence their properties, was relatively meager. Expansion of the work dealing with paper was, therefore, considered desirable, and a paper section was established in 1911. During the ensuing years, the Bureau assisted materially in the development of paper testing standards and standards of quality for papers, and in the advancement of knowledge of the properties and performance of papers and of materials and processes for their manufacture.

The Bureau serves as a testing laboratory for both the Federal Government and state governments. Paper purchased by the Federal Government is tested regularly for compliance with specifications, and considerable testing is done in the development of the specifications. Tests of paper are also made for the public, but as excellent commercial laboratories are now available, such services are confined to referee testing, tests for calibration of instruments, check tests with other laboratories, tests to assist in answering inquiries, and tests to add to the fund of information about paper.

Bureau research in the field of paper and related materials has two general aspects: paper problems of the Government and problems of industry or the public. Government agencies often transfer funds to the Bureau for the support of particular projects of interest to them. Also industrial associations or trade groups frequently support research associates who work with the staff of the Bureau on problems of interest to the Government, industry, and the public.

The Bureau's research and testing may be classified under five subjects: (1) papermaking materials and processes, (2) testing methods, (3) use of paper in printing, (4) permanence of record materials and preservation of records, and (5) properties and specifications. A brief description of the work in these fields follows. Over the years this research work has led to the publication of over 190 papers, incorporating the results of Bureau investigations.

1. Papermaking Materials and Processes

Research on papermaking materials and processes is conducted in a paper mill fully equipped for practically all

Fig. 1—Rotary digester in which fibrous materials are cooked with chemicals in preparation for papermaking

types of such research on both laboratory and semicommercial scale *(34)*. The two types have shown good agreement in testing the papermaking quality of fibrous materials *(7)*.

The laboratory-scale equipment consists of a rotary boiler, beater, mold for forming sheets, sheet press, and dryer. This equipment is very useful when only a small amount of material under investigation is available, and for tests preliminary to semicommercial tests. The semicommercial equipment provides for both papermaking and the processing of paper. It comprises machines for cutting, dusting, and cooking fibrous raw materials, and for beating and bleaching the fibers; a fourdrinier paper machine which makes a trimmed sheet 26 inches wide; a supercalendar for imparting a high degree of smoothness and gloss; equipment for coatings and impregnations; and the usual sheet-cutting and trimming machines. This installation is sufficiently large so that industrial conditions are successfully simulated and there have been no difficulties in adapting the results obtained at the Bureau to commercial production.

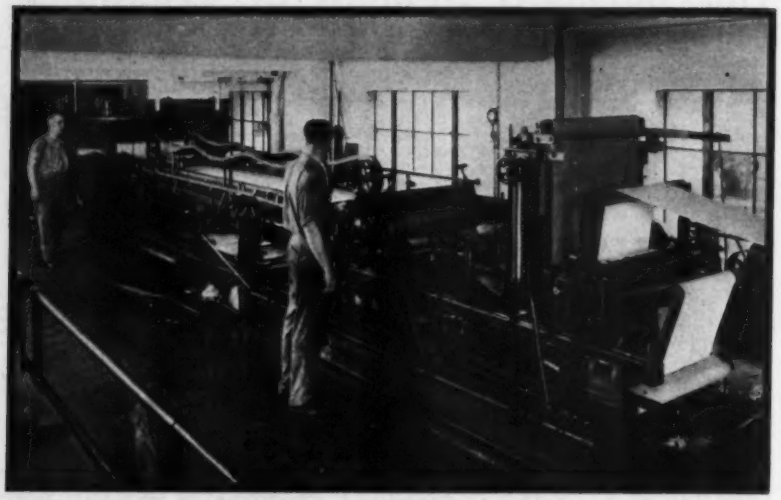

Fig. 2—Experimental paper machine

The work carried on in the mill includes trials of materials not being utilized for papermaking to determine their potential value for the purpose; studies of papermaking materials to find their relative value or to find their relation to the properties of papers; development of new or improved papermaking processes and papers. Such studies are usually not feasible in commercial mills because they would seriously affect production and because the processes cannot be controlled sufficiently to obtain accurate data.

(a) Fibrous Materials

Fibrous materials are investigated to obtain information on the practicability of substituting other plant fibers for the common papermaking fibers in view of the possibility of shortage of the latter; the possibility of obtaining new types of papers or new properties in papers from such materials; and the possibility of making profitable use of waste products of this kind.

Continuous effort is being made in this country to find profitable uses for waste plant materials such as bagasse (extracted sugar cane), cornstalks, cotton stalks and straw. Their utilization for the manufacture of paper and fiberboard has received considerable attention. In general, however, they have not been able to compete in this country with wood for papermaking because of higher collecting and storing costs and, in some instances, the lower yield of papermaking fiber. With the increasing cost of pulpwood in the United States and with development of improved methods of collecting, storing and processing the substitute materials, the latter may find more extensive use in papers. Cornstalks, bagasse and straw are used for fiberboards because the raw material for this purpose does not require much refining, and yield of fiber is, therefore, high while production cost is low.

Straw compares favorably with wood in its content of papermaking fiber *(13)*, and it is used extensively abroad where there is a scarcity of wood. At present in this country, only seed flax straw is used for making fine papers. Unlike other straws, it contains the long, strong linen fiber from which linen cloth is made. One of the earliest Bureau studies dealt with the papermaking value of this straw *(1)*. Pulping tests were made both in the experimental mill and in a commercial mill. Excellent results were obtained, but at that time utilization of the straw was not economical (Figure 1).

Because waste cornstalks are available in large quantities, considerable effort has been made to utilize them for fibrous products. Studies by the Bureau *(12)* and by other investigators have shown that the small content of papermaking fiber, the large content of pith, and the difficulty of pulping them because of structural peculiarities of the stem *(9)* make cornstalks unsuitable for papermaking. Experimental studies at Iowa State College on the production of insulating board from cornstalks, made with the co-operation of the Bureau, showed they were suitable for this purpose *(10)*, and they are now being so used commercially. Bagasse, which is also used for the manufacture of insulating board, was found to have papermaking characteristics similar to those of cornstalks. Cotton stalks also present an enormous potential source of fibers for papermaking, but although they give a good yield of fibers, difficulties in pulping the stalks and bleaching the fibers *(2)* make them inferior to wood.

Experiments also have been made on plants that might yield fibers which would supplement the supply of rag or waste rope fibers used for very strong papers. *Phormium Tenax* (New Zealand flax) *(11)* and *Caroá (7)*, the fibers of which are used to some extent for textiles, were found to be promising raw materials for papermaking. *Phormium Tenax* is native to New Zealand, and the tests were made in co-operation with the New Zealand Government which wished to find an additional means of utilizing the plant. *Caroá* is indigeneous to Brazil where it grows abundantly. The tests of it were made with respect to the manufacture of strong rope-fiber paper, and it is now being used in this country for this purpose. Cotton fiber is the fiber most largely used in the higher grades of writing and other fine papers. It is obtained largely from cotton rags or from the waste of cotton textile mills. In co-operation with the Department of Agriculture which was interested in the disposal of surplus cotton, study was also made of use of raw cotton for papermaking, and no technical difficulties were found. At present some raw cotton fiber is used for paper. Papers commensurate in strength and stability with high-grade cotton fiber papers were made from highly-purified wood fibers produced commercially by special refining processes.

(b) Nonfibrous Materials

Studies are made of nonfibrous materials used or proposed for use in paper to find their relative merits and to develop optimum papermaking practice in the use of them.

Finely-divided mineral products are used as fillers in paper for improved opacity and printing quality. Papermaking investigations have been made of all the most commonly used fillers: clay, asbestine, talc, calcium sulphate, and gypsum *(18)*. An investigation of the relative quality of foreign and domestic papermaking clays was made at a time when the former were favored because they had been in use long before high-grade domestic clays were developed by special refining processes. The results of the tests demonstrated that the domestic clay compared very favorably with the foreign clays both in the papermaking operations and in the quality of papers *(16)* containing them (Figure 2).

At the request of the National Association of Glue Manufacturers and with the assistance of research associates supported by the Association, extensive studies were made of the use of animal glue in papermaking as an adhesive for mineral coatings which are necessary for the highest grades of printing *(19, 22)*, as a sizing material incorporated in the paper *(21)*, and for surface sizing *(20)*. The results yielded better knowledge of choice of grades of glues for these purposes and of the processes of using them. Studies also have been made of the use of casein and starch as adhesives for mineral coatings *(24, 25)*.

The U. S. Department of Agriculture developed a method for producing high-grade starch from cull sweetpotatoes, a waste product. In co-operation with the Department, a study was made of its use for sizing paper, and it was found to be fully equal, and in some respects superior, to corn and cassava starches commonly used for the purpose *(27)*.

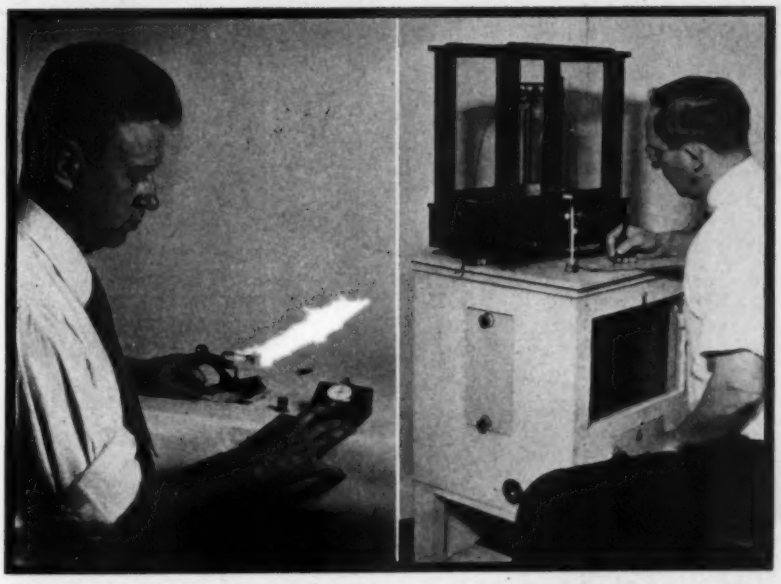

Fig. 4 (left)—Microburette devised for delivering a precisely measured drop of water as little as 0.01 ml., in testing the absorptiveness of thin tissue papers. . . . Fig. 5 (right)—Cabinet for testing for permeability to water vapor, under controlled atmospheric conditions

(c) Manufacturing Processes

Experiments on the manufacture of roofing felts, made in co-operation with the Asphalt Shingle and Roofing Institute, demonstrated that by suitable processing sawdust and waste newspapers could be substituted in part for the more expensive rags used for the felts, without impairing their quality *(36)*.

In co-operation with the Bureau of Engraving and Printing, an extensive investigation of the manufacture of currency paper was undertaken. The purpose was the development of a paper having improved wearing quality because replacement of worn-out paper currency is very expensive. Through modifications of the mechanical treatment of the fibers in the beating engine, paper having more than double the folding endurance of the paper in use was produced from the standard mixture of 75 per cent linen fibers and 25 per cent cotton fibers. Trial printings showed that the new type of paper possessed the required printing quality, and it was adopted by the Treasury Department and is being procured without increased cost *(33)*. In order to better evaluate the wearing quality of the currency paper, a crumpling device was developed which simulates the cracking of the surfaces of paper currency by service wear *(40)*. Cracking causes defacement of the printing, the chief reason for withdrawal of the currency from further service. This tool was used to evaluate the relative wearing quality of experimental papers made from various grades of rag and wood fibers, and from caroá and sisal fibers. Such information would be helpful in event of interruption of supply of linen and cotton rags normally used. In this study, melamine resin was found of benefit in improving the strength of the papers and their resistance to (Figure 3) surface wear *(41)*.

Early in World War II, assistance was given the Army Map Service of the Corps of Engineers in the development of a new war map paper. Unique

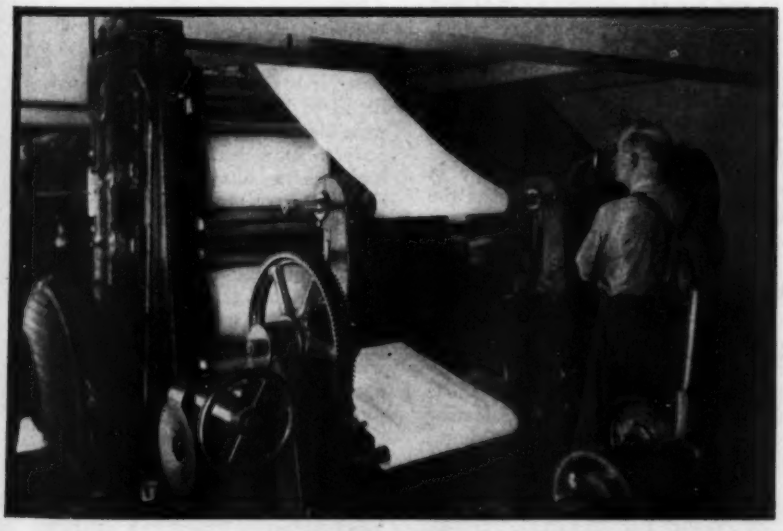

Fig 3—Supercalendering paper

Fig. 6—Rule designed for precise measurement of change in dimensions of paper during offset printing

qualities built into this paper gave it satisfactory service in contact with water, mud, and grime of the battlefield that had disintegrated papers heretofore used. An important part of the developmental work was papermaking studies in the Bureau's paper mill of the various commercial wood pulps available for the purpose. The information obtained by these studies was applied with much success in assisting commercial mills to get into successful production of the paper with a minimum of delay. The high resistance of the paper to disintegration when wet was obtained by use of the relatively new development of resin bonding; melamine-formaldehyde resin was used *(43)*.

Another important product of the paper mill is a paper dyed with a light-sensitive blue dye for calibrating arc lamps used for testing photochemical effects, colorfastness to light, and resistance to weathering. A reference standard lamp was developed, and the dyed paper for calibration is exposed to the lamp for various periods. To calibrate a lamp in terms of the standard lamp, the rate of fading of the paper by the lamp being calibrated is compared with that of the standard lamp.

2. Testing Methods

Progress in the development of quality specifications for paper is dependent to a large extent on the development of means of measuring quality. For this reason, considerable attention is given to improvement of paper-testing technique. The results of the Bureau's research on paper testing standards is made effective through close co-operation with the Technical Association of the Pulp and Paper Industry and the American Society for Testing Materials in the development of their official testing methods. These methods are accepted as national standards. Test methods and in some cases test instruments have been developed in all branches of paper testing. The design of some of the commercial testing instruments has been improved, and in some instances better means of calibrating and adjusting have been devised.

(a) Chemical

Considerable study has been devoted to testing methods related to the stability of papers. Improved methods have been developed for the determination of alpha-cellulose content *(47, 49, 50)* and copper number *(46, 47)* of fibers, which are measures of their chemical purity and thus their stability; and for *p*H acidity *(52, 53)* and resin *(48)* content of papers, which adversely affect the stability of papers. A simplified volumetric method developed for alpha-cellulose saves considerable time, particularly when sizing and filling materials are present. These methods assisted materially in the Bureau's extensive research on the stability of papers and the preservation of records.

(b) Mechanical

Studies have been made of commercial instruments used for testing the bursting strength *(60, 68)*, folding endurance *(62, 66, 70)*, tensile breaking strength *(57, 64)*, tearing resistance *(54, 55, 63)*, and thickness *(56, 65)* of paper.

Instruments have been developed for measuring resistance to surface wear *(61)*, for calibration of the Schopper folding endurance tester *(62)*, for increasing the capacity of the Elmendorf tearing tester *(63)*, for testing hygroexpansivity *(72)*, and for measuring (Figure 4) degree of curl *(77)*

(c) Optical

Investigations have assisted in analysis of the fiber composition of papers *(80, 82, 83, 85)*. A method developed for differentiating unbleached sulphite and sulphate pulps is standard for the purpose *(78)*.

Testing relating to optical properties has been studied extensively. These studies deal with measurement of opacity and various reflective properties such as gloss, brightness, whiteness, and color. Opacity standards made of opal glass were developed *(88)*; the preparation of a magnesium-oxide reflectance standard was described *(93)*; instruments were developed for the measurement of gloss *(91, 94)* and brightness *(94)*; and a method for measurement of whiteness was proposed *(89, 92)*.

Apparatus for study of the photochemistry of sheet materials has been developed. Destructively high temperatures were found within the materials under the usual conditions of irradiation by an electric arc, such as in "weathering" and "light" stability tests. The apparatus permits control of the temperature of the test specimens, thereby eliminating the effect of heat *(95)*.

(d) Permeability to Fluids

Permeability to liquids and gases is one of the most important properties of several classes of papers such as writing, wrapping, toweling, and building. Considerable attention, therefore, has been given to this very difficult kind of testing.

A study was made of over thirty methods that had been proposed by various investigators for testing for water resistance but none of them was found to be adequate. Two methods were devised that have proved satisfactory. One that is suitable for testing paper such as writing paper consists in measuring the rate of curl when one side of the paper is moistened with water. An instrument was developed for making the test *(97, 99)*. The other method, termed the dry-indicator method, is applicable to all classes of water-resistant papers, even those waterproofed with asphalt such as packaging and building papers. A mixture of dye, sugar, and starch is spread on the surface of test specimens floated on water; the mixture changes color as soon as moisture has permeated through the paper *(98, 99, 102)*.

Considerable attention has been given to testing for resistance to water vapor permeation, a prime requisite of packaging and building papers. Assistance has been given standardizing organizations in the development of standard methods, one of which is for testing under normal atmospheric conditions, and the other for testing at high temperature and humidity in simulation of tropical conditions *(103, 105)*. For making such tests a constant temperature and humidity cabinet was developed, in which the test cells are suspended. The cells, hung by hooks from a rotary suspension disk, can be suspended mechanically one at a time from a weighing rod attached to a balance placed on the top of the cabinet. This arrangement facilitates the testing and prevents errors that may occur when test cells are removed to a different atmosphere for weighing. A new type of cell was devised *(110)* and improved technique for sealing the test specimen on it was developed (Figure 5).

A study of commercial devices used to measure the air permeability of papers revealed that for the denser papers the accuracy of the devices was questionable. Leakage of air around the edges of the test specimen or uncertainty in the effective area of the specimen resulted in questionable accuracy. An apparatus was designed which eliminated these uncertainties; it yields results reproducible to within a few tenths of 1 per cent for even very air-resistant sheet materials *(100)*.

(e) Hygrometry

For accurate results, paper must be conditioned for testing and tested in an atmosphere of controlled humidity, which necessitates controlled temperature also. Several types of paper have been tested in the range of 15- to 83-per cent relative humidity for basic ream weight, bursting strength, tearing resistance, folding endurance, tensile breaking strength, and stretch to failure in tension *(109)*.

An inexpensive cabinet was devised in which constant humidity is maintained by various solutions. Testing instruments within the cabinet are manipulated from outside by means of rubber sleeves and gloves attached to arm holes in the wall of the cabinet *(106, 107)*. Information also has been published on various ways of measuring relative humidity *(108)*.

3. Use of Paper in Printing

At the request of the Lithographic Technical Foundation, and with the assistance of research associates supported by it, research on offset lithographic papers has been carried on for several years. The study was requested because enormous losses resulted from lack of knowledge of optimum properties of the papers and of the technique of using the papers in the printing process.

A survey of 31 lithographic plants showed that misregister of successive color prints was the most serious difficulty. The chief cause was change in the dimensions of the paper during printing caused by changes in moisture content of the papers, which pointed to the necessity of carefully conditioning them and printing in a moisture-controlled atmosphere. Most satisfactory register was obtained with the papers that had received the least drastic processing of fibers in manufacture *(113)*. The effects of moisture content variations on dimensions and strength were determined, and information on the rate of conditioning was obtained *(114)*.

Where air conditioning is available, the best results are obtained when the paper is conditioned to equilibrium with relative humidity 5 to 8 per cent above that of the press room prior to start of the first colorprinting and printed under constant conditions. Without air conditioning, good results are obtained if the moisture content of the paper is adjusted at the paper mill so that the paper will reach the printing plant with a moisture content of 0.5 to 1.0 per cent above equilibrium with the press room air *(115, 116, 118, 119, 120, 121)*.

In further studies of the effect of the mechanical treatment or "beating" of fibers in the manufacture of offset papers, 73 experimental papers were made from various wood fibers in the Bureau paper mill. The papers were made with widely varying degrees of beating of the fibers, and the effects of the variations were determined by laboratory and printing tests of the papers. The results confirmed the indications obtained in the printing of commercial papers. For best results in multicolor printing, wood-fiber papers should be made with the minimum of beating necessary to obtain the required formation and finish *(122)*. In similar studies of rag fibers (Figure 6), severe beating did not have an adverse effect *(123)*.

Bibliography of NBS Publications

Publications are listed in this section grouped in chronological order under the same headings as those of the text. The reports of the investigations are published either in government publications or in outside publications. Copies of the publications can be consulted in many of the larger libraries.

Where the price is stated, the publication can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The prices quoted are for delivery to addresses in the United States and its territories and possessions and in certain foreign countries which extend the franking privilege. Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for $1.00 and good until used), or by check or money order payable to the "Superintendent of Documents, Government Printing Office" and sent to him with order. Articles marked "OP" are out of print and reprints are no longer available.

1. Papermaking Materials and Processes

(a) Fibrous Materials

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Reducing Hidden Costs
Through Labor Relations

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▶▶▶ REDUCING LABOR COSTS without reducing wages is a management "must" for 1948. Such costs fall naturally into definite categories. The first and most obvious is that of *direct money wages,* which includes base wages, skilled differentials, merit rate ranges, bonus incentives, overtime and the like. *Fringe benefits,* a second natural grouping, includes such labor costs as paid holidays and vacations, hospitalization and other insurance, sick leave, severance pay, profit sharing and pension plans, etc. Both these types are measurable and easily accounted for on the books—but neither of them is susceptible, at the present time, of any marked reduction.

There is a third category, however, within which management *can* bring about definite and worthwhile economies. I refer to the so-called *"hidden costs,"* the ones which do not figure as costs on the payroll, and for which there is no item on the profit-and-loss statement. They include such drains as excessive time spent in training, due to improper selection of employees; time consumed in grievance handling; the costs of turnover and absenteeism; man-hours lost through illness and accidents; low efficiency traceable to poor morale; bad work habits; time losses due to lack of instruction or improper maintenance; the time consumed in long-drawn-out negotiations with unions, plus many others almost too numerous to mention.

If there were no other justification for a well-rounded labor relations program, this one objective of reducing or eliminating such costs would be sufficient to make the effort worthwhile. Every one of the conditions mentioned is an obstacle to efficiency, so the net effect of their removal or mitigation is *lower unit cost through improved production.* In short, the treatment pays for itself directly as well as indirectly.

To be specific, here are some of the things that can be done to reduce the burden of hidden costs:

Excessive Time Spent in Training

Where this involves the number of new employees added, the fault most often lies with the personnel department, being traceable to improper selection. Sometimes the latter is due to the fact that hiring is not being done by qualified persons. In other cases, the hiring procedure is at fault. Job descriptions may be inaccurate or absent altogether; the application form employed may not be designed to elicit all the needed information; the aptitude tests may be inadequate or even wrong.

More basic still, the fault may lie with the type of people who apply for jobs—which in turn may be due to unfortunate community relations on the company's part. There are cases on record where excessive turnover and resulting high-cost training were reduced through better recruiting methods—tied in with intensive local public relations to "sell" the employer to the community. One of the lowest rates for annual induction cost belongs to a company which gives job priority to applicants brought in by present employees. Its records prove that such recruits tend to remain longer with the firm than those attracted by "help wanted" advertisements. Of course, this company's labor relations are "right"—or it could not depend on such methods.

Selection is also a factor in training present employees for better jobs. The worker who is poorly equipped to handle a task involving a higher or different skill should be screened out before training begins. This condition arises most frequently where *job analysis*—especially experience rating — falls down. A keen study of the experience necessary for a job means a great deal, whether it be for recruitment or upgrading purposes. The same is true of aptitudes and abilities, such as the coordination of sight or other sense with physical movements, ability to manipulate small parts or devices, etc. Training can not be expected to fit the round peg for the square hole.

If the nature of the plant permits, training costs can frequently be pared by so rating and scheduling jobs that the work an employee does today may prepare him for the higher job tomorrow—or next year. Supervision of the right sort, which always has an eye for the manpower squeeze around the corner, can go far to reduce time and effort devoted to extra training.

Excessive Time Spent in Grievance Handling

Most companies do not spend *enough* time settling grievances, in the sense that employees are not given sufficient opportunity or encouragement to air their resentments. However, there are also many companies where grievances take up more time than necessary—either due to a poorly organized sys-

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This article is in two parts. It will be continued next month.

tem or to wasteful abuse on the part of shop stewards privileged to file employee grievances. Every employer should keep track of the time spent by stewards in handling grievances. If the union shares the cost of such activities, through a contract clause which limits the company's payment for time so spent, the stewards are more apt to streamline their participation.

Permission to settle grievances is not authority to wander all over the shop or to turn a five-minute discussion into a lengthy conference. The Institute recommends the use of a Grievance Time Record maintained by the foreman or supervisor in each department, giving the date, hour and duration of each occasion—thus recording how much time the steward spends away from his bench or machine. It is also sound practice to include in the union agreement a proviso that the stewards be limited to one for each department, and that they obtain the foreman's permission before leaving their work to handle a grievance.

Time spent in other union activities can also constitute a "hidden cost." Most unions require that certain delegates attend conventions and other meetings, while there is also a certain obligation of the employer to give union officials time off without pay to attend to union business. It is well to have a clear understanding on such points before giving blanket permission.

Absenteeism and Turnover

While considerably below wartime and reconversion averages, these still constitute a definite burden. Full employment itself is partly to blame: new jobs are easy to get. Marginal workers are another cause: they have a casual attitude toward employment, often preferring to "lay off" now and then rather than build up a good attendance record. Discipline is not the complete answer to such cases—but a lack of it, due to over-tolerant disregard of abuses, is bound to have a cumulative effect on the work-force as a whole. Unexcused absence or tardiness, too often compounded, should be punished by suspension or discharge.

During the war years, effective use was made of employee interviews to find the reasons underlying high absenteeism and turnover. For example, a worker reporting late was required to see the plant manager or superintendent, and the causes brought to light were corrected, if possible. The exit interview, mandatory upon the resigning worker, had a similar purpose and effect. Dissatisfaction over a foreman's attitude, or over conditions in the plant, led to changes that kept other workers loyal.

Sickness and Accidents

Industrial medicine is making great strides, but the fact remains that thousands of plants are without a medical director, or even a nurse. Some communities are attacking the problem through local foundations and clinics, with the cost underwritten by participating employers. In others, local hospitals are adding industrial health departments, often with the encouragement and sponsorship of the Chamber of Commerce or the Manufacturers' Association. In addition, both state and federal governments are paying increased attention to the need for reducing illness and accident due to work hazards. Trade associations are also giving greater heed to these problems.

A plant-wide Health and Safety Committee, made up of employees representing various departments, is a proven device for eliminating hazards, as well as for keeping check on plant housekeeping, lighting, ventilation and other working conditions. Awards for excellence help to keep interest at a peak, especially if well publicized in the employee publication and the local press. Into such a program additional devices like voluntary health examinations, cold prevention programs and other activities dovetail without the resistance which might otherwise be encountered. *Caution*: ALWAYS offer health tests, injections and similar projects on a purely voluntary basis.

Bad Work Habits

Early quitting and late returning at lunch hour; early quitting at night; overstaying rest and relief periods, and taking excessive washup time—these are a few of the cost-provoking abuses which employees easily slip into, but which can be eliminated by a return to reasonable plant discipline. Last year's portal-to-portal frenzy did help for awhile by focusing the spotlight on badly located washrooms, time clocks and entrances — which in themselves were a *cause* of non-productive time. Not all of these facilities have been moved to better spots; a little more thought to employees' convenience might reduce abuses.

Setting a good example is one of the best ways to handle such situations. There is little use penalizing a worker for washing ahead of time, if the foreman in his department "gets away" with a similar infraction. When office employees are allowed to leave before the production workers, they may have all exits from the parking space blocked when the plant force gets out—which may lead, first to a race and then to a feud. The executive who disregards the no-smoking rule and rides on the freight elevator only justifies others in aping him.

"Visiting" and "walking around" are other time-wasters which every supervisor worth his salt can overcome. Often they trace back to favoritism, or to the pre-LMRA period when only workers were allowed "free speech." All too many times, the provocation was deliberate, in an attempt to get the foreman on the record as "abusive" or "against the union."

One of the best safeguards against lax or improper work habits is a clear understanding between management and the employees, via the union contract, as to what the lunch hour, rest period and wash-up time are, and as to behavior which is subject to discipline by the employer.

Time Lost in Waste and Spoilage

Insofar as these losses are due to lack of instruction or to improper maintenance, they are susceptible to correction through better labor relations. The *material* cost through spoilage is often less than the cost of work-time involved —and the "hidden cost" skyrockets if the interruption spells delay and consequent pay-loss for other workers in the production line. The alert supervisor can do much to minimize and prevent such occurrences.

Low Efficiency Due to Poor Morale

The difference between an efficient, low-cost plant and an inefficient, high-cost plant will often be found in the co-operation and teamwork of the former and the indifference and inefficiency in the latter. The experiments conducted during the war by various companies operating two or more plants —very often with identical material and wage costs—proved that the so-called "intangibles" of good labor relations were the reason for the good showings. Actually, they are not "intangible" at all: there is nothing more real than friendliness between managers and managed. Good human relations transcend all the obstacles however solid the latter can be. A genuine desire to solve problems often dissolves the differences that produced them in the first place.

There is no excuse for inefficiency due to poor morale—because there is no excuse for poor morale. The right kind of spirit on the part of the workers is as much the responsibility of management as the right kind of product. Both are largely a matter of controls, as the foregoing paragraphs indicate.

Time Lost in Negotiations

It is easier to blame the union representatives for protracted, long-drawn-out negotiations than to take an inward

look—and blame oneself for delays due to lack of information on the spot, or on insufficient preparation of management representatives before the meeting took place. Bargaining is more than agreeing on principles and policies. Every union demand ultimately costs *something* in dollars and cents. How much will two added holidays cost? A five-cent increase in the basic wage? Or a new shift differential? What is the difference, in payroll deductions and retirement value, between a trusteed pension plan and an actuarial plan? Will the proposed incentive plan raise take-home pay, and by how much? What is the impact of higher freight rates on the company's profits and selling prices?

Facts . . . facts . . . and more facts! Tenacity of opinion is no substitute for information. That explains why more and more controllers of large companies are being named to negotiation committees, and why many more are devoting increased time to the development of factual material.

More and more companies are learning, too, that negotiation is an art, as well as a performance required by law. They have seen how the unions with which they deal are represented at the bargaining table by *professionals in bargaining*—men who do nothing else, all year 'round, but conduct negotiations with employers. Small wonder that such firms are relying more and more on professional negotiators of their own—skilled men who have watched all the major demands originate and develop, and who know the hidden pitfalls that often lie beneath a casual approach.

When not caused by the need for additional information—often as helpful to the company as to the union, or more so—stretching out negotiations may be a matter of strategy on the union's part. Alertness on the management side may shift the advantage. After all, no one has a monopoly on timing.

There are other "hidden costs," besides those discussed in this article. New ones arise, and older ones disappear, but all are symptoms, rather than causes. Show me any situation which is obstructing normal teamwork between employer and employee, and I will show you a basic misunderstanding, or a fundamental inability to see two sides of the question—whether the bias be on the employer's side or on the employee's.

Just as a cost accountant or an auditor can sum up a company's financial condition by checking into certain figures on its books, so can the competent labor relations counsel "audit" the efficiency and cooperativeness of the work-force. Looking at the people themselves, and watching them perform their duties, he puts his finger on costs that the accountant cannot see, and which are difficult to measure in terms of dollars and cents. That is why, in accounting terminology, they are "hidden" costs—although, to the labor-relations-minded, they are seldom hidden!

Early United States Patents on Papermaking—Part II

RAYMOND G. McKENZIE

▶▶▶ ONE OF THE FIRST patented beater sizing processes is found in Patent No. 12,361 issued to Henry Glynn, February 6, 1855. A fatty substance or wax is dissolved in potash or soda and 9 pounds of the "hydrated soap" is added to 250 pounds of pulp in the engine. The "soap" is precipitated on the fibers in the engine by copper sulphate or magnesium sulphate.

The use of suction boxes under the forming wire is shown in patent No. 16,430 of January 20, 1857, issued to J. S. Blake. The water removed was returned to a save-all. Another interesting feature was the use of an air jet to trim the sheet while on the forming wire, the air pressure being obtained from the exhaust side of the vacuum pump. The trimmed material was returned to the system. Still another feature resided in the use of a curved rod with rollers on it to stretch the wet felt across the width of the machine. Unfortunately, the drawings are not suitable for reproduction.

A horizontal, rotary digester was patented by A. C. Mellier (Patent No. 17,387), May 26, 1857. The main features consisted of indirect heating within the digester and automatic condensate removal under a pressure of 84 pounds psi. Heat recovery was practiced by passing cold water through the heat exchange system to cool the charge and provide warm water for washing the pulp. Caustic soda of 2 to 3 degrees Baumé was used as the pulping agent.

Clark in Patent No. 17,917 of August 4, 1857, discloses the use of white water to wash the forming wire and wet felts.

The Jordan is too well known to go into any details. The drawing of patent No. 20,277 issued to Jordan, Jr. and Eushee, May 18, 1858, is shown in Figure 7. The single claim reads: "We claim, as our improved machine for the manufacture and sizing of pulp, that it is constructed of a single conical grinder and outer shell, and with pipes for the introduction of the rags and the size, and the education of both arranged with reference to the axis and the ends of the grinder, substantially in the manner, and so as to enable the grinder to operate to reduce the rags to pulp and mix the sizing therewith, as explained."

Plasticizing paper was first patented May 10, 1859, the process is covered by patent No. 23,897 issued to James Brown. The process discloses adding glycerine to either the pulp or the finished sheet.

Nitric acid was patented as a pulping agent for straw by Ebenezer Clemo, July 10, 1860, by patent No. 29,059. This is the first of a large number of attempts to use nitric acid as a pulping agent. Many advantages are claimed for its use, particularly the possibility of pulping at low (under 100 C.) temperatures. Economically these processes have not turned out favorably.

Benjamin Lambert patented a process (patent No. 32,879) for deinking paper July 23, 1861. The process comprises boiling the printed paper in a caustic alkali solution of 1.001 specific gravity for about two hours. The paper and solution is allowed to cool and stand for about 12 hours, after which the liquor is removed and the paper reboiled in fresh liquor for about one hour. The paper is then beaten in the second liquor, drained and washed.

A suction cylinder mold was invented by J. F. Jones and covered by patent No. 38,684, May 26, 1863. While this was not the first use of a suction device on a papermaking machine, it marks the beginning of the general application of these devices in the art.

Patent No. 34,581 issued to A. S.

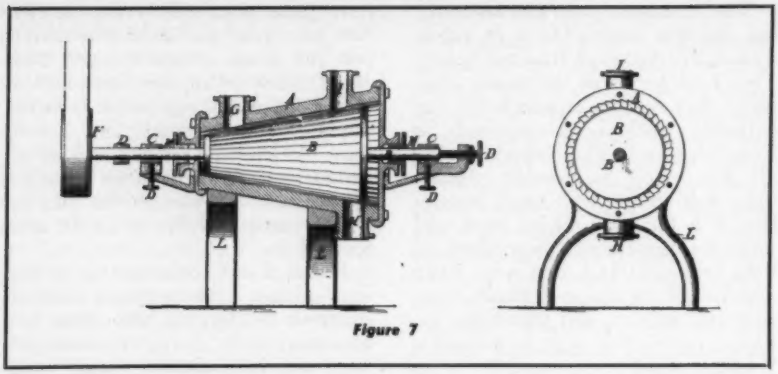


Figure 7

Lyman, March 4, 1862, teaches the use of high temperature to soften wood for and while grinding. The process involves heating small pieces of wood in water at 300 to 400 Fahr. "for a few moments" then circulating the material through a "grinding-cone" until completely pulped. Lyman immediately followed up this invention by another, covered by patent No. 40,696, which made the process continuous. The apparatus used is shown in Figure 8. Pump L forces the wood chips and water through pipes F and A and through the grinder H. The hot pulp from H is used to preheat the incoming material in section W.

The use of sodium silicate as a sizing agent was patented by Van Derburgh, April 19, 1864, patent No. 42,450. A "highly-silicious alkaline silicate" is advised.

An early board machine, covered by patent No. 49,884 was invented by J. F. Jones. The patent drawing is shown in Figure 9. The main feature resided in providing an upper wire E over the forming wire B so that the pulp sheet could be pressed between the two wires.

The application of centrifugal force to separate dirt from pulp was patented July 2, 1867, by George Sellers. The drawing of patent No. 66,258 is shown in Figure 10.

The acid sulphite process was invented by Benjamin C. Tilghman and was covered by patent No. 70,485 issued November 5, 1867, but antedated to October 26, 1867. This patent is one of the most interesting and remarkable patents found in the entire papermaking art. Considering that it was written over 80 years ago and covers a basic invention its clarity, conciseness and comprehensiveness is unsurpassed. This patent is highly recommended reading for anyone interested in papermaking, for inventors or would be inventors, and also for patent attorneys. The invention is best described by phrases taken directly from the patent disclosure:

"The whitest parts of the wood are to be selected to make white paper, and it is to be cut across the grain into slices about ⅛ to ¼ of an inch long. A strong iron vessel, of any convenient size and shape, lined with lead, and provided with a steam-jacket, and with the necessary pipes, cocks, and manholes for filling and emptying the charge, and with gauges, safety valves, and thermometers, to indicate height of liquid, pressure, and temperature, is about 2/3 filled with the sliced wood.

"A solution of sulphurous acid in water, of about specific gravity 1.025 to 1.035, in which a quantity of sulphite of lime has been dissolved, sufficient to raise its density to about specific gravity 1.07 to 1.08 is then run in until the vessel is nearly full, allowing for the absorption of the liquid by the wood and its expansion by heat, so that the wood may be kept constantly covered by the liquid during the operation. The vessel is then closed, and heat is applied by means of the steam-jacket until the temperature of the liquid is about 260 Fahr., at which it is kept during about 6 to 8 hours. The steam is then shut off from the steam-jacket and fresh water is forced into the top of the vessel, the acid solution being at the same time allowed to escape gradually from below into a covered lead-lined tub, where it is boiled by steam until the sulphurous acid gas is expelled. This gas is conveyed by a pipe to a suitable condenser, where it is absorbed by cold water, to be re-used on another charge of wood. A quantity of sulphite of lime will generally be deposited during the boiling, which may be reused. Instead of driving off the sulphurous acid gas by boiling, or after part of it has been thus driven off, the acid may be neutralized by the addition of hydrate of lime, forming sulphite of lime, which can be re-used. After being washed, the woody substance is left to drain, and then, if on examination it is thought necessary in order to complete the separation and bleaching of the fibers, it is to be again treated with a fresh charge of sulphurous acid and sulphite at a temperature of about 260 to 280 Fahr. during about 3 to 5 hours. Then the acid liquid is to be run off as before, and the fibrous product is washed until all the acid and soluble matters are extracted. It is then taken out of the lead-lined vessel and beaten into pulp by the ordinary machines. If not sufficiently white, it is to be bleached in the usual manner. . . .

"The action of the acid solution in dissolving the intercellular or cementing matter appears to be gradual and progressive, first loosening the substance into coarse fibers, and then reducing these into finer and still finer constituents, until perfect pulp is produced. Wood or other vegetable fibrous substance, treated so as to dissolve its cementing matter only partially, will be found capable of being reduced by mechanical beating and rubbing to a

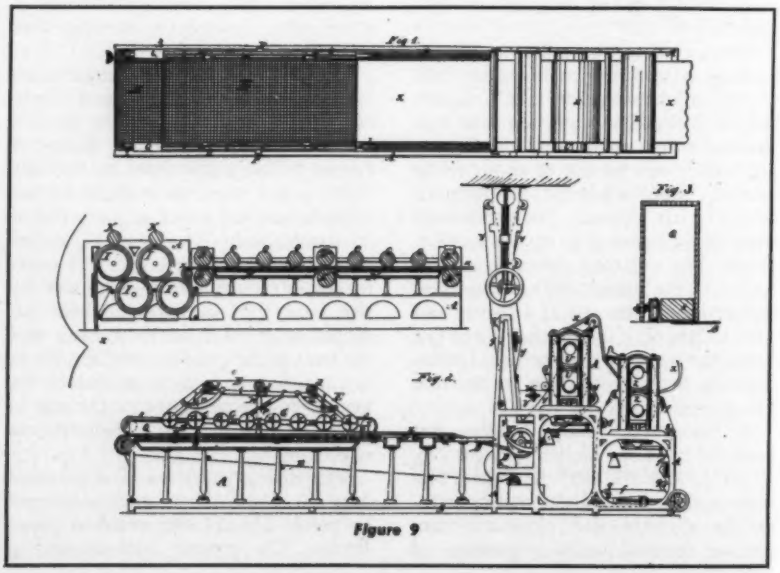


Figure 9

mass of fibers, or sort of coarse pulp, applicable to uses where strength and stiffness are desired, such as wrapping paper, pasteboard, millboard, papier-maché, etc. The solvent action of the hot acid liquid on the wood may be made more rapid by causing it to circulate freely through the pores of the mass by any of the usual methods, either mechanical, such as pumps, stirrers, or agitators, or by causing a column of the liquid to be more highly heated than the rest so as to rise to the top and diffuse itself, or, where the scale of manufacture is sufficiently large, by having several vessels filled with the materials, through which the hot acid liquid is forced to pass in succession, so that fresh acid solution is applied to wood already nearly exhausted of soluble matter, and the nearly saturated acid solution is brought into contact with fresh wood. . . .

"I prefer with all kinds of materials to operate at as low a temperature and with as weak acid solutions as is compatible with a practical rapidity of working. . . .

"When flax, hemp, or other long-fibered plants are to be treated to obtain fibers for spinning, I operate in the manner above described, but to avoid too much disintegration and weakening of the fiber, care must be taken to graduate the extent of the action according to the nature of the material used and the effect desired to be produced. . . .

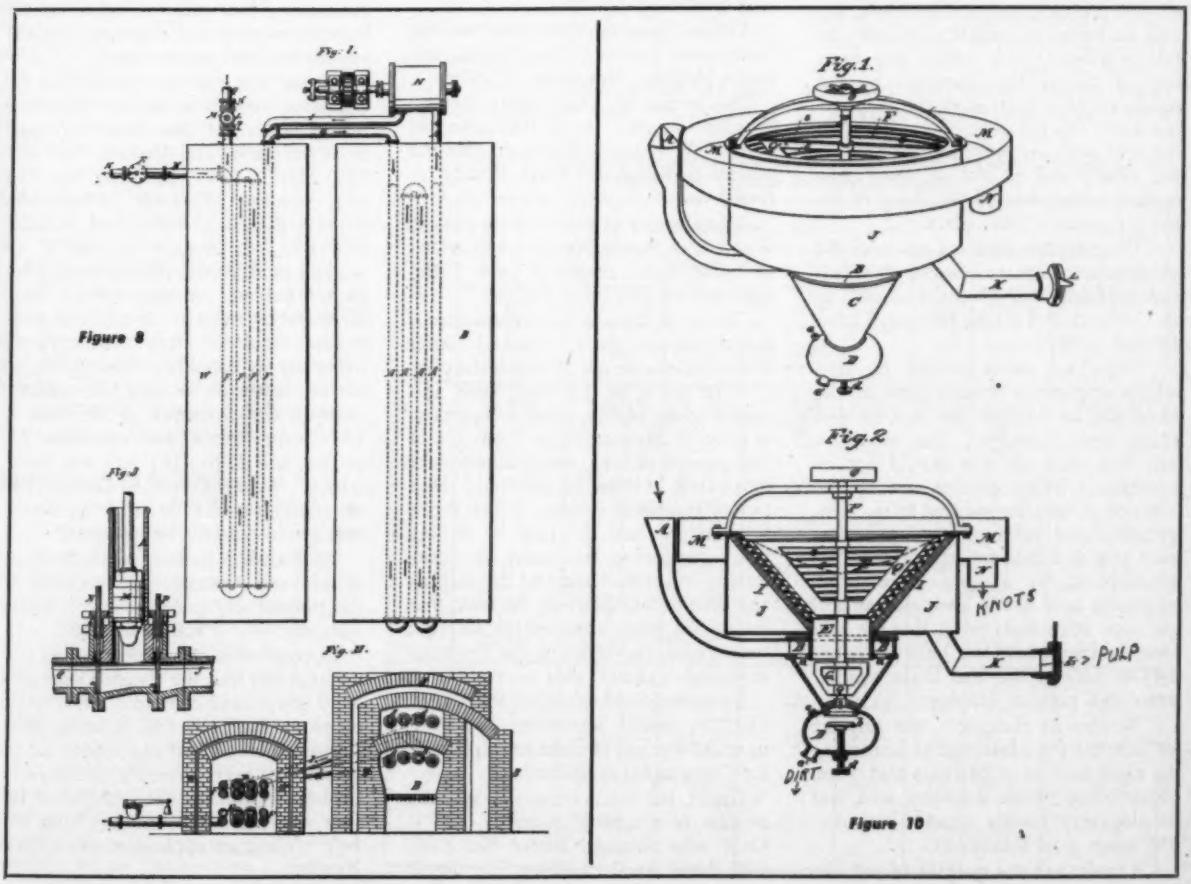
"The dissolving action of the acid solution appears to take effect first upon the matter cementing the long compound fibers to each other and to the stem of the plant, and next attacks the cementing matter of the long compound fibers themselves, reducing them into a number of shorter and finer fibers. If the action is still longer continued, these are still further disintegrated, and become at last so short and fine as to be unfit for spinning, and suitable for paper pulp. If, on the other hand, the dissolving action is not carried far enough, the long fibers do not separate readily from each other and from the stem and skin of the plant. The attention of the operator must therefore be given to arrest the action at the precise point most suitable for the object he has in view, whether a fiber as strong as possible, even though somewhat less fine and less easy to clean, or a finer and cleaner fiber, but somewhat shorter and weaker. Different kinds of plants, and of different degrees of maturity, require different degrees of action of the solvent liquid in order to produce a given result. I, therefore, follow the progress of the operation, and ascertain when the desired degree of disintegration is obtained by taking samples from time to time by means of a rod ending in a cork-screw, and working through a stuffing-box and stop-cock in the side of the vessel, as is well understood by engineers. . . .

"It is desirable that plants of nearly uniform size and growth should be selected to be operated on together. . . .

"When about to treat a new material, I prefer to ascertain by preliminary trials on small quantities the length of time and degree of action best adapted to the object desired, which can afterwards be adhered to. . . .

"Straw, grasses, osiers, young woods, and similar vegetable fibrous substances treated in this manner, so as to dissolve only partially the cementing matter of their fibers, will become more flexible and more suitable for making hats, mats, baskets, and hoops, and for other uses where pliability is required. . . .

"The volatility of the acid, and its corrosive action on metals, must be provided for, and the inside of the



apparatus should be lined with lead or other suitable material. . . .

"The stronger the acid solution the more rapid is the action at a given temperature. Also, the higher the temperature the more rapid is the action with a given density of acid solution. With weak acid and comparatively low temperature, the effect can be produced by continuing the digestion a sufficiently long time. Or by using a solution saturated when cold with acid gas at or above common atmospheric pressure, the action may be made more rapid. . . .

"Care must be taken, however, that the temperature be not raised high enough to cause a blackening action on the vegetable substance, which is apt to take place with some materials at about 300 Fahr., and more readily in the treatment with the first charge of acid than with the suceeding ones. . . .

"The solution of sulphurous acid in water at the requisite temperature appears to be the efficient agent in dissolving the intercellular or cementing matter of the vegetable fibrous substance, and where the color of the product is of no consequence, the operation may be performed with the sulphurous acid solution alone, without the addition of sulphite. In this case a reddish brown color is given to the resulting fibrous product, and the acid solution will be found to contain a quantity of free sulphuric acid, which has been formed during the operation by the oxidation of a portion of the sulphurous acid. The presence of a sulphite in the acid solution prevents this reddening effect, and in case of many substances a considerable bleaching of the fibrous product takes place. . . .

"The probable mode of action of the sulphite is to present a base with which the sulphuric acid combines as soon as it is formed, and is thus prevented from further action. . . .

"There are other classes of salts which operate to some extent in the same way as the sulphites, but are less cheap and convenient. The requisites are, first, that the salt should not be capable of being decomposed by the solution of sulphurous acid at the temperature and pressure employed; second, that it should be capable of being decomposed by a weak solution of sulphuric acid at the temperature and pressure employed; third, that the acid thus set free should not have the property of coloring the fiber at the temperature and pressure employed. . . .

"Besides its cheapness, the sulphite of lime has the advantage of furnishing an equivalent of sulphurous acid when decomposed by the sulphuric acid, and is also very readily recoverable from the spent acid solutions. . . .

"I prefer to use a quantity of sulphite of lime, sufficient to insure that some of the salt shall be present in the acid solution during the whole operation, and that some shall remain undecomposed after the action on the fibrous substance is completed. . . .

"After the sulphurous acid has been driven off (of the used liquor) or precipitated, the liquid extract containing in a soluble form the products of the saline and intercellular or cementing constituents of the plants may be utilized in various ways in the arts, or may be used as manure. It contains a weak organic acid, somewhat resembling ulmic acid, and when boiled down has some of the properties of gum . . . "

With all his knowledge of the process, Tilghman was unable to make a financial success of his invention. Mechanical difficulties deterred him to such an extent that he finally abandoned his efforts and entered another field. A successful process was finally developed about 1879 by Fry and Ekman in Sweden.

The use of rubber press rolls was patented (No. 71,108) by E. Wilmont, November 19, 1867.

E. T. Ford patented the use of a suction roll having an internal, stationary suction box of adjustable width, November 3, 1868. The device is covered by Patent No. 83,617.

Aniline dyes to color pulp in the beater were patented (No. 96,321) by James Hogben, November 2, 1869.

The re-use of white water is very broadly claimed by I. Hoffman in Patent No. 102,265. However, note the patents to Blake and Clark already referred to.

A forerunner of the sulphate process is found in Patent No. 106,143 issued to Asahel Eaton, August 9, 1870. Eaton discloses his process as follows:

"In the practice of this improvement, I first put the straw, wood, or other fibrous substance out of which the pulp is to be made, in the water tank, and raise it to the boiling point. I then take, to a ton of straw or wood, from 200 to 500 pounds of lime, which I first make into a milk of lime. To this I add about twenty pounds of sulphur. I then throw the mixture into the tank of boiling water containing the straw or wood, leaving the combination of the sulphur and lime to take place in the tank, thus saving the preparation of the sulphide beforehand, and continue the treatment as though a caustic soda were used."

Eaton followed this with Patent No. 119,224, issued September 26, 1871, in which the use of sodium sulphide as a pulping agent is claimed.

Credit for discovering the sulphate process is generally given to Carl F. Dahl who obtained Patent No. 296,935, dated April 15, 1884. The digesting solution used by Dahl contained, "on the average, 37 per cent sulphate of soda, 8 per cent carbonate of soda, 24 per cent soda hydrate, 28 per cent sodium sulphide, 3 per cent diverse combinations." A solution of 6 to 14 deg. Baumé at 5 to 10 atmosphere oven pressure is recommended for wood and a solution of 5 to 8 deg. Baumé at 2 to 5 atmospheres is recommended for straw. The time required is 30 minutes to 4 hours for wood and 3 to 8 hours for straw. The alkali salts are recovered by evaporating the used liquor and fusing it at a "dark-red heat." The loss of 10 to 15 per cent of alkali is made up by adding an equivalent amount of alkali as sodium sulphate to a solution of the recovered salts and then boiling the solution with lime.

A creped water-leaf sheet for use as a towel was claimed by Edward Parrish, May 30, 1871, in Patent No. 115,511.

Robert Russell was issued an interesting patent (No. 131,465), September 17, 1872, covering an explosion process for defibering vegetable substances including wood. The process involved heating the material used with steam for 5 to 10 minutes at 60 to 200 pounds psi and then exploding the material by releasing the pressure suddenly. Several variations such as impregnating the material with caustic before steaming and digesting the exploded material are disclosed.

Russell was not the first to use an explosion process to defiber vegetable materials: Lyman, No. 21,077, August 3, 1858; Fuller and Upham, No. 47,539, May 2, 1865; Bailliere, No. 73,429, January 21, 1868; Allen, No. 87,387, March 2, 1869, and Arnold, No. 130,462, August 13, 1872, all worked in this field. Also several other earlier patents on this subject were taken out by Russell. A mill was built by the American Fibre Disintegrating Company in Brooklyn, New York, to use an explosion process but unfortunately it was destroyed by fire June 4, 1868 before coming into operation (3, p. 204, and 1, p. 216) and was never rebuilt. What effect this disaster had on developments in the insulating board field can only be surmised.

Thus ends a period in which many of the basic processes and machines of the present day papermaking industry were discovered and developed.

In conclusion, the writer would like to point out that the Patent Office files are a great source of free information on papermaking as well as many other subjects. Much effort and money would be saved if every inventor or would-be inventor consulted this information before working on an idea too long and before filing an application for Letters Patent.

Effect of Decay on the Groundwood Pulping of Quaking Aspen

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▸▸▸ ASPEN AS A MATERIAL for the production of groundwood as well as other pulps is receiving more and more consideration, principally because of its lower cost and ready availability in certain regions. Normally, most pulpwood contains some decay, the amount of which depends on a number of fairly well-known factors. Aspen ranks among the species having low resistance to decay and, therefore, would be expected to contain as much, if not more, decay as other species if stored under comparable conditions. Since the selection of only sound wood for pulping is not feasible in most instances, information on the effect of decay is of importance. This article presents data obtained at the Forest Products Laboratory in a relatively limited study of the groundwood pulping of quaking aspen containing various amounts of decay.

Thickens *(1)* previously had found that under about the same grinding conditions, partially decayed spruce could be ground with lower power input, higher rate, and, consequently lower unit-energy consumption, but that it produced weaker and darker pulp of shorter fiber length than sound spruce wood. Kress and others *(2)* had reported obtaining from decayed spruce a groundwood pulp that was shorter-fibered and about 17 per cent lower in yield than that from sound spruce. Papers made from the two pulps were about the same in strength, but that from the decayed wood was decidedly darker in color and had more shives. The pulp from the decayed wood lost more strength during storage than that from the sound spruce.

Description of the Wood

The wood for the Forest Products Laboratory experiments on quaking aspen, supplied by a commercial cooperator, consisted of nine lots of 6-inch blocks. Five lots were designated "dry," or seasoned wood, and four as "wet," or presumably green or waterlogged wood. When received, the wood was frozen, but it was thawed out at room temperature before being sampled and used in the tests. Disks about 1 inch thick were cut from the ends of a number of selected blocks of each lot and used for the determination of alkali solubility, dryness, decay content, and other physical characteristics presented in Table 1. The decayed areas on the disks were outlined by a member of the Division of Pathology, the decay was classified as advanced or incipient, and then the areas were measured with a planimeter. The per cent of decay by volume was based on the relation to the area of decay to the total area of the face of the disk. The five lots of dry wood ranged from 0.6 per cent to 25.4 per cent advanced decay, and from 3.6 per cent to 31.5 per cent incipient decay, by volume. The wet wood ranged from zero to 15.0 per cent advanced decay, and from 0.3 per cent to 4.4 per cent incipient decay, by volume.

(*) Maintained at Madison, Wisconsin, in cooperation with the University of Wisconsin.

Equipment and Method of Operation

The Forest Products Laboratory experimental grinder was used for this work. The grinder, appurtenant devices, and method of its operation were essentially the same as have been described previously *(3)* except for the pulpstone. An aluminum oxide pulpstone dressed with 10-cut, 1½-inch-lead spiral and 14-point diamond burrs was used. The stone had been in service 70 hours since its last burring and prior to the start of these experiments. The stone's surface condition was medium sharp. All runs were made at a stone-surface speed of 3,470 feet per minute, wood-stone pressure of 15 pounds psi, grinder-pit temperature of 160 Fahr., and pulp consistency of 3.0 to 4.0 per cent.

Discussion of Results

The grinding and pulp test data are presented in Table 2. The series on dry wood (runs 545 to 549, inclusive) containing progressively increasing amounts of decay, showed no marked differences in grinding characteristics or in pulp properties except for brightness that decreased (from 64.7 to 46.2 per cent) with the amount of decay. The fraction of the pulp retained on a

TABLE 1—Physical Characteristics and Alkali Solubility of Quaking Aspen Containing Various Amounts of Decay

Type	Physical characteristics							1 percent sodium hydroxide solubility
	Decay		Dryness	Specific gravity, oven-dry weight and green volume	Average diameter	Average age	Average rate of growth	
	Advanced by volume	Incipient by volume						
	Percent	Percent	Percent		Inches	Years	Rings per inch	Percent
Dry								
1	0.63	3.63	78.3	0.373	7.80	48	12.3	18.6
2	6.03	7.11	81.7	.385	7.31	49	13.4	17.2
3	13.20	4.88	81.0	.379	6.91	41	11.9	17.6
4	12.40	21.32	77.2	.349	6.40	44	13.8	17.5
5	25.40	31.50	75.8	.364	6.08	49	16.2	19.3
Wet								
1	0	.34	47.3	.368	5.36	21	7.8	19.0
2	0	8.92	50.2	.394	5.22	24	9.2	18.6
3	0	20.70	47.8	.389	4.87	25	10.3	18.1
4	15.0	44.40	46.4	.389	4.90	24	9.8	20.2

TABLE 2—The Grinding of Aspen Containing Various Amounts of Decay

Grinder run No.	Wood[1]			Grinding data[2]				Properties of pulp suspension							Properties of pulp test sheets[3]					
	Decay content		Dryness	Consistency	Stone service time	Grinding rate moisture-free wood per 24 hours	Power input	Energy consumed per ton moisture-free wood	Freeness		Screen analysis				Burst-ing	Tear-ing	Tensile		Density	Bright-ness	Dirt count
	Advanced	Incipient							Schopper-Riegler	Canadian Standard	Retained on 24-mesh	Retained between 24-80 42-mesh	42-80 90-mesh	80-80 150-mesh	Passing 150-mesh	Fiber-length index					
	Percent	Percent	Percent	Percent	Hours	Tons	Hp.	Hp.-days	Cc.	Cc.	Percent	Percent	Percent	Percent	Percent		Pt. per lb. per ream	Gm. per lb. per ream	lb. per sq. in.	lb. per in. width	Gm. per cu.		
Dry Wood																							
545	0.6	3.6	78.3	(2)	70.0	0.59	49	83	350	87	5.6	11.4	24.1	16.9	42.0	0.095	0.24	0.57	1220	20.1	0.39	64.7	173
546	6.0	7.1	81.7	(2)	71.0	.57	46	80	330	75	2.9	10.7	26.6	19.0	43.8	.082	.27	.54	1482	23.1	.39	60.8	154
547	13.2	4.9	81.0	(2)	72.1	.63	52	76	337	80	2.0	9.5	22.4	16.3	49.8	.084	.24	.51	1162	17.9	.40	57.8	289
548	22.4	21.3	77.2	(2)	72.9	.57	44	78	347	85	2.5	9.8	24.3	16.8	46.7	.090	.22	.48	1243	21.0	.40	53.3	169
549	25.4	31.5	75.5	(2)	73.7	.67	49	73	300	70	1.8	9.0	22.3	19.3	48.6	.085	.22	.49	1334	21.3	.40	46.2	339
Wet Wood																							
550	0	8.3	47.3	3.5	74.4	.79	48	62	495	170	7.1	10.2	17.4	27.1	38.2	.097	.34	.46	709	11.6	.35	66.5	180
551	0	8.9	50.2	3.2	73.1	.82	52	63	450	133	4.3	9.1	20.0	25.3	41.3	.083	.28	.38	729	12.7	.35	62.4	177
552	0	20.7	47.8	3.0	73.9	.73	50	68	439	130	4.3	8.9	16.0	30.3	40.5	.082	.15	.30	755	12.7	.36	56.2	255
553	15.0	44.4	46.4	3.0	76.7	.75	49	65	397	115	1.6	5.3	11.5	30.5	51.1	.079	.12	.36	579	10.1	.35	46.7	394

(1) See Table 1 for other conditions and properties of the wood.

(2) The pressure of wood on stone was 15 pounds psi. This is the actual thrust of the pressure-foot divided by the area represented by the product of the pocket width and wood length. Grinder-pit temperature was 180 Fahr. and shower-water temperature was 100 Fahr., except for runs 550 and 551, where shower-water temperatures of 105 and 110 Fahr., respectively, were used.

(3) Basis weight of test sheets, 115 pounds per ream (25x 40-500).

(4) Stone-service time at start of each run is the cumulative hours of operation (based on three-pocket operation at 3,150 fpm) since burring with a 10-cut, 1½ in. lead, spiral burr, and a 14-point diamond burr. Peripheral speed used in these experiments was 3,468 fpm with three pockets in use simultaneously. Stone immersion was 9 inches.

(5) Per square foot of wood-stone contact area represented by the product of pocket width and wood length.

(6) Measured with a Hunter reflectometer calibrated in accordance with TAPPI method T217Sm-48.

(7) Not determined, but estimated to be between 3.0 and 4.0 per cent.

24-mesh screen decreased, and, in general, the average fiber length (measured by the fiber-length index) decreased slightly as the amount of decay increased. Bursting strength was in general slightly lower, and tear was consistently lower with the greater amounts of decay, while the tensile strength varied inconsistently. The dirt count, while not showing a consistent trend, was about twice as high for the pulp (run 549) from wood with the most decay as for that from wood with least decay (run 545).

The series on the wet wood (runs 550 to 553, inclusive) gave results similar to those obtained on dry wood except for the range of values. Decay affected brightness to the greatest extent, as it decreased consistently from 66.5 to 46.7 per cent as the amount of decay increased. There was also an appreciable decrease in freeness (from 170 to 115 cubic centimeters, Canadian Standard) with increase in decay, while the average fiber length, the fraction retained on a 24-mesh screen, and the tear, decreased to some extent. Bursting and tensile strengths varied somewhat, but showed no consistent trends, although the values for pulp prepared from the most decayed wood (run 553) were lower than for all the others.

At least some of the inconsistent variations found in the data within each series might be attributed in part to differences in the physical characteristics, other than decay, of the wood from batch to batch. It may be noted in Table 1 that the specific gravity varies somewhat, but not consistently, with the decay content, as would be expected. Except in one or two cases, the variation in specific gravity is about that normally found within a species.

The yields of pulp were not determined, so the effect of the amount of decay on this value is not known.

The values for 1 per cent sodium hydroxide solubility did not show an expected increase with the amount of decay. This may be partly due to the fact that in the preparation of the sample by the Standard TAPPI method material passing 60-mesh screen is discarded. It is possible that some of the more friable decayed wood was lost in this fraction. Further, the analysis was made on wood from the disks that had been previously soaked in water for the specific gravity determination, so that the amounts of water-soluble as well as alkali-soluble matter may have been reduced thereby. Analyses reported by Kress *(2)* for aspen showed a difference of 3 per cent between the alkali solubility of sound wood and wood in the initial stages of decay. In the analysis of spruce, the increase between

sound and "very slightly" decayed wood was somewhat more (about 6 per cent) and with "slightly" decayed wood the difference was considerable (about 12 per cent).

Conclusions

These groundwood-pulping experiments on quaking aspen indicate that decay in wood appreciably affects the brightness and slightly affects the bursting and tearing strengths and average fiber length of the pulp in inverse proportions to the amount of decay present, but that the decay has little or no effect on grinding rate, energy consumption, and tensile strength. The greater proportions of decay also introduce appreciably larger amounts of dirt.

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2) Kress, Otto, and others, Control of Decay in Pulp and Pulpwood, U.S.D.A. Bulletin 1298 (April, 1925).

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Paper Mill Proves That Noise Abatement Pays

FRANCIS A. WESTBROOK

▶▶▶ MEASURES FOR THE abatement of industrial noise are being taken in more and more fields and the paper industry is among them. An excellent example of the present trend of this practice is furnished by Fernstrom Paper Mills, Inc. of Pomona, California, which is a manufacturer of tissue and carries on large converting operations to make the paper into its final products. These include tissue wrappers for fruits and vegetables which require printing.

Actually, this company does a great deal of printing and as its presses are all of the high speed rotary type, this printing department is decidedly noisy. For this reason, the management decided on acoustical treatment or sound conditioning, especially as the press room adjoins the general office space to which the noise was communicated.

The acoustical treatment resulted in a drop of noise level of 7½ decibels, or a reduction of noise energy of about 70 per cent. It is very evident from the comments of the employees working in the noisy area that they had a distinct feeling of relief. In fact many of the press operators had the habit of frequently leaving the room on one pretext or another, for a brief respite from the excessive noise. After the corrective treatment they have not done this as much. The workers in the adjoining offices also felt the relief. The management considers that the job was well worth while.

Sound conditioning consisted simply of installing tongued and grooved acoustical tile 24 inches by 24 inches by 1 inch thick, known as Acousti-Celotex, in the ceiling panels and on the available wall surfaces from the ceiling down to within eight feet of the floor. The installation was made at a time when the presses were shut down for repairs so that there was no interference with production. As a matter of fact acoustical tile easily can be put in place during any off periods when the presses are not in operation without

Press room at Fernstrom Paper Mills showing acoustical treatment of part of the walls (photo courtesy The Celotex Corp.)

causing any operating inconvenience.

The acoustical tile installed here, and the type mostly used for industrial applications, is a porous fibrous material with a great many closely spaced perforations. Sound waves striking the material enter these spaces and are largely absorbed instead of being reflected. The tile also improves the appearance of the room and as it may be painted repeatedly by ordinary methods, the light reflecting qualities may be maintained to a high standard. In places where ceilings next to the roof, for example, are treated, the tile acts as a good insulator against heat in summer and cold in winter. The tile may be nailed to wood furring strips or cemented to plaster, concrete or metal and is generally easy to install.

Sound conditioning, or acoustical treatment, does not eliminate the noise at its source and is not intended to do so. But it does largely do away with the reflection and building up of noises. When a work space is occupied by a number of noisy machines, the sounds from each are reflected from the ceiling, walls, and other surfaces on which they impinge. The result is a great confusion of noises coming from all directions. It also usually happens that some of the sounds build up so that the result may be louder, or of a different pitch, or both, than the noise emanating from any one source.

If, say, the ceiling is covered with acoustically absorbent material the sound waves striking it are mostly absorbed. The worker at a given machine hears his own noises or those immediately adjacent, which he is accustomed to and expects. He hears only dully, or hardly at all, reflected noise from the more distant machines which may be sudden and startling and therefore nervously fatiguing. Nor is there any serious building up of noise by reflection. Furthermore the element of a confusion of noises coming from many directions, which is so distracting and wearing on the nerves, is largely eliminated. Another important thing accomplished by the acoustical treatment is the absorption of high frequency, or high pitched, noises which are peculiarly distressing to most people. Some industrial operations give forth such high frequency noises directly, and in other cases the imposition by reflection of several comparatively low pitch sounds result in a combination of much higher pitch. All of these considerations are based on actual experience.

In the majority of cases, treatment of the ceiling suffices, but in others, as at the Fernstrom Paper Mills, it is worth while to treat the walls as well. It depends on such matters as the shape of the room, the location of the noise sources in it, the character of the noise, etc. In other words, each location which is to receive acoustical treatment must be considered separately, and the properly trained and experienced acoustical engineer is qualified to make suitable recommendations.

The effect of industrial noise on the workers has been the object of careful investigation by management and the medical profession. The results are of definite practical value as they are based on observation and ascertained facts. Many of them are very interesting and applicable to more conditions than are probably generally realized. The paper industry doubtless has many situations worth considering from this angle.

Among the important facts brought to light is the part played by the individual human equation in its reaction to excessive noise. That is, some people will suffer serious effects from a noise while others working alongside them will show no symptoms of harmful effects at all, or not until after a long exposure to it. However, medical research has proved conclusively that continued exposure to excessive noise has bad results such as high blood pressure, nervous fatigue leading to reduced mental and physical efficiency, indigestion, neurasthenia, poor digestion, etc. In most instances high frequency noises have greater adverse effects on people than low frequency, even when the two noises are of equal intensity.

About the only way to benefit a group of workers exposed to noisy surroundings is to take measures to abate the noise generally, or to remove the annoyance factors so that not enough noise or annoyance remains to trouble any normal individual.

The frequency of accidents has been found to be closely related to the state of fatigue of the workers and to the mental distraction caused by noise. Noise abatement, consequently, is highly desirable in many locations because it will both reduce fatigue and distraction, and should be an important consideration in every safety program. Another point which should be considered in connection with accident hazards is that experience has shown that in noisy locations the sound of approaching danger is very often obscured, as when a machine or belt is about to fail, or when an industrial truck blows its warning horn.

The decibel is the acoustical engineering unit for measuring the physical intensity of sound, or noise, as determined by a sound level meter. There is no essential connection between the decibel rating of a noise and its effect on the human nervous system because, as previously intimated, the quality of the noise determines to a large degree its reaction on different individuals. By quality is meant the frequencies which constitute the noise, its monotony or suddenness, loudness as measured by the human ear, confusion, etc. It is a well-known fact that of two noises of equal decibel ratings, one may be extremely irritating and the other not at all disturbing, depending on the individual. Acoustical engineering cannot be an exact science so far as prognosticating the effect of a given noise on a given individual is concerned. It has determined many useful principles which can be used for noise abatement and the general over-all increase of worker efficiency, which has always been found to result when a group is relieved of continued exposure to excessive noise.

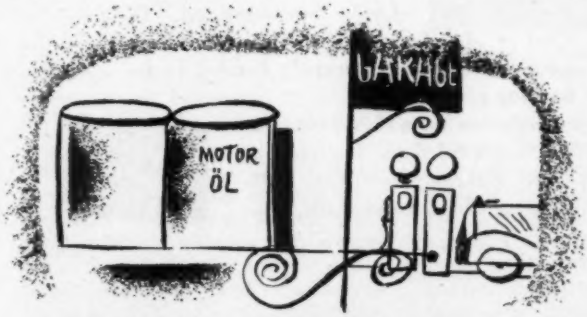
Sound at the "threshold of hearing," or that which is just audible to the normal person, is said to have a physical intensity of zero decibels. When it begins to be painful, at the "threshold of feeling," its decibel value is around 120 to 130. In a survey made by Allen Wilson and Hale J. Sabine, of the Acoustical Department of The Celotex Corporation, to determine the range of noise levels in typical American factories, measurements were made in 33 separate plants covering a wide diversity of industries and machine operations. Of all the readings taken in actual work areas the highest was 105 decibels and the lowest 65 decibels. In the large majority of cases the observed noise levels ranged quite uniformly between approximately 85 and 105 decibels.

To give an idea in terms which can be understood by everybody it might be said that ordinary conversation measures up to about 65 decibels, a noisy office up to 80, the average factory 85 to 95 and areas where metal sawing, riveting, grinding and some kinds of printing are carried on range from 95 to 125 decibels. Any area where the rating is 80 to 100 decibels is considered unduly noisy. The press room of the Fernstrom Paper Mills with its rating of 82 decibels is therefore distinctly in this class. The fact that reduction of 7.5 decibels in physical intensity of the noise secured by acoustical treatment meant a reduction of 70 per cent in noise is because the power ratio follows a logarithmic law which is 10 trillion to one between the threshold of hearing and threshold of feeling. An increase in intensity of one decibel represents an increase in power of 26 per cent and a 10 decibel increase means an energy increase of 1000 per cent. Decreases in decibel values correspondingly rate proportionate decreases in power much in excess of the per cent decrease in decibels.

Paper SKETCHES . . . . . .

EARLY IN THE 1590's, SPANISH PAPER WAS USED IN THE PHILIPPINE ISLANDS BY DOMINICANS IN THE PRINTING OF BOOKS

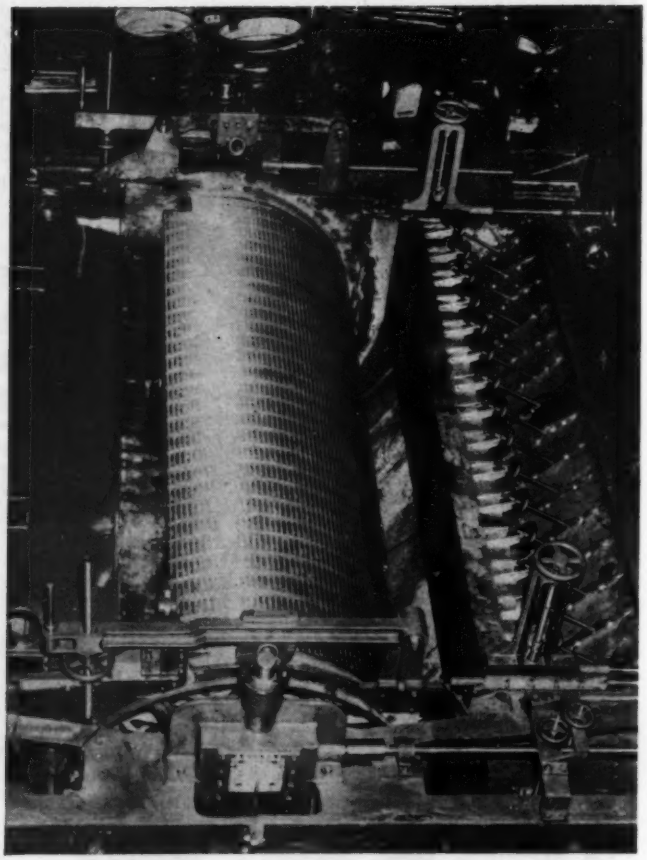
During THE AMERICAN REVOLUTION, PAPER BECAME SO SCARCE, THAT SHEETS OFTEN WERE TAKEN FROM MILLS WHILE STILL WET AND UNSIZED.



PAPER CONTAINERS MADE OF ALUMINUM-COATED CHIP BOARD AND SPRAY-COATED INSIDE, ARE BEING MADE IN GERMANY FOR MOTOR OIL CONTAINERS

THE CHINESE OF THE LATE 600's KNEW HOW TO MAKE PAPER INSECT-PROOF. THEY WERE REQUIRED BY LAW TO IMMUNIZE CERTAIN TYPES OF PAPER AGAINST INSECT DAMAGE

They had three good reasons for building this cylinder mold vat of LUKENS CLAD STEEL



Center section of cylinder mold vat fabricated of ¼-inch, 10% Nickel-Clad Steel by Hendrick Manufacturing Company of Carbondale, Pa., for Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.

1. **No rust particles form here to impair the quality of the product.**
2. **No rusting or rotting of the vat.**
3. **Solid nickel protection with clad steel economy.**

Three moneysaving reasons for building this cylinder mold vat of Lukens Nickel-Clad Steel. The user profits four ways—reduced product losses and, for the equipment, longer life, lower first cost and less maintenance.

Lukens Clad Steels make it economical for builders of such machinery to employ nickel, stainless steel, Inconel and Monel in many places where solid sections of these same materials are too expensive. You get *solid* metal protection at the lower cost of *clad* steel construction.

Lukens Clad Steels are now available in the Sodium Hydride Finish—smoother, easy to keep clean and minimizes sliming. Claddings of 10% or 20% of total plate thickness suit most requirements, but other percentages are available by special arrangement. Each plate is a precision product—Nickel-Clad, Stainless-Clad, Inconel-Clad or Monel-Clad—with the cladding, in uniform thickness, permanently bonded to the steel backing plate.

Bulletins 255 and 338 contain much helpful data. For copies, write Lukens Steel Co., 408 Lukens Bldg., Coatesville, Pa.

CLAD METAL STEEL

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

Superintendents Association Holds 28th Annual Meeting *in the South*

▶▶▶ THE OLD AND COLORFUL city of New Orleans, Louisiana, chosen as the stage for the 1948 convention of The American Pulp and Paper Mill Superintendents Association, presented to those who attended it a very happy and sunny mood during the entire three days of scheduled sessions, May 19 to 24, 1948.

This twenty-eighth annual meeting of the Association was the third that has been held in the South, the two former occasions having been at Richmond, Virginia, in May, 1927, and in June, 1935. The registered attendance was 607.

The convention was formally opened on the morning of the nineteenth by President Raymond F. Bennett. Following a few words of welcome, an invocation was pronounced by Reverend D. H. Eddington, Jr., First Presbyterian Church, New Orleans.

The names of ten members of the Association who had passed away during the last year were read by George W. Craigie, secretary-treasurer, and a silent tribute was paid to their memory. The ten members were: Harry J. Kruse, Clarence A. Patchell, George H. Pountain, J. W. Raines, Fred J. Rooney, F. G. Sherbondy, Homer E. Stafford, Lewis E. Weiser, John F. Yordy, and Orville B. Ziegler.

President's Address

President Bennett reviewed the activities of the Association during the past year in the following message:

I consider it a rare privilege to have this opportunity of opening the 28th Annual Convention of The American Pulp and Paper Mill Superintendents Association, Inc. In doing so, I wish to extend a hearty welcome to every member and friend of the Association who is here assembled.

On the afternoon of June 18, 1942, in a business meeting of Association Members, held in Grand Rapids, Michigan, during the 23rd Annual Convention, I was elected fifth vice president. In acknowledging the honor and looking ahead with pride to the year when I hoped to be your president, I made you a promise and that was to do my best, not to let you down. Having been elected your president at the Annual Meeting a year ago, I have tried to keep that promise; but, in doing so, I find that I have gained more than I have given the Association.

The opportunities which have been mine during the past six years, and especially during the past year as president, have been numerous. The more I have been able to give to the work of the Association (and here I want to thank Mr. Straus, president of The Ecusta Paper Corporation, for his understanding attitude and wholehearted support), the more I have gotten from it personally.

Never shall I forget the many friends made during my term in office and the pleasure that was mine in visiting various divisional groups of the Association, and in visiting a number of pulp and paper mills in widely different parts of the country. Their hospitality was most heartwarming.

Raymond F. Bennett, retiring president of the Association

Another new production record was made in 1947 by the United States paper industry. According to published figures, more than 21,000,000 tons of paper and paperboard were made by the industry last year. That record certainly is of interest to our Association as our members, every last one of them, contributed greatly to the making of it.

The year 1947 was also a record year in Association activities. Divisional meetings for the most part have been particularly good and some of them outstanding, both for attendance and quality of material presented. We have been fortunate in having divisional officers who realized their responsibilities.

Nationally, our constant aim has been to broaden our service to our members, our affiliates, and the industry.

New Projects Started

In keeping with this policy, we have started work on 15 projects. Each project pertains to mill operation and will lead up to a published report. Other projects will follow. If any of you are called upon to give support to this work, please do so, as it is only through such co-operation that satisfactory progress can be made.

To take care of this and similar work, and to understudy our secretary-treasurer, we procured the services of Harry Weston. Since Mr. Weston was already located in Chicago (which is centrally located to a large part of our membership and many affiliates), it was decided that his office should be there. Consequently, on the 16th of last February, this office was opened at 38 South Dearborn Street and has been working closely with our headquarters office in New York since that time.

Now we are not only able to give increased service, but are guaranteed against interruption, to our continuous smooth operation by the incapacity of any one person. This contingency had been generally realized as evidenced by an impressive number of letters of commendation on the new arrangement.

Our membership totals 1,380 (with the number of new members increasing as the year progressed). Some of the increase has come from Canada, where we have been asked to form a new division.

Our affiliates number 139. Additions to this list are promised for the near future.

The past year saw the publication of our Chemical Book which is now in the mail.

It was also decided to publish a report of the 1946 General Maintenance Conference. This report is ready for distribution.

At the instigation of certain affiliates, a committee of our members compiled

Shown here going over Association convention plans are: (L to R) Harry E. Weston, associate secretary-treasurer; Raymond F. Bennett, presiding president and general chairman of the convention; George W. Craigie, secretary-treasurer of the Association and convention manager

a list of rules for the proper care and safe operation of paper machine dryers. This compilation was printed and distributed to the membership. In addition a supply has been retained for interested affiliates.

All of this literature contains a wealth of information of help to our membership.

A copy of the Year Book was sent to the president of each mill in which we had members, as well as to presidents of mills where we had no members. In each instance, we wrote a personal letter telling of our wish to be of service to the industry. The response to this mailing in applications for membership, and in assurances of support, was most gratifying.

The Planning Committee, established somewhat more than a year ago, has been taking its responsibilities seriously; and effects of its efforts will become more strongly felt as time goes on.

Third Bolton Award Contest

Winners of the Third Bolton Award Contest, sponsored by John W. Bolton & Sons., Inc., and conducted under the auspices of the Superintendents Association, were announced recently. Congratulations to every winner; better luck next time to every one of the hundreds of participants, and our thanks to the sponsors for their continued generosity and co-operation.

The continued well-being of the Association is due in no small measure to the active support of mill management. Among the leaders of our industry are many who realize that that which benefits one individual or firm benefits the whole. May the Association merit an ever-increasing confidence of these men and those who follow after them.

Another strong source of support of the Association has been the business press of the industry—our official magazine, *Paper Mill News,* and the contemporary publications serving the industry. To the publishers and editors of each of these publications who have been such good friends, I wish to say, "Thank you," and to express the hope that this spirit of camaraderie between the Association and the press will become a stronger and stronger tie to the end that future generations of papermakers will learn easily what many of us have had to strive so hard for.

The American Paper and Pulp Association has given us an opportunity to serve on certain of their committees, and their president and staff have been most considerate and helpful. To them we express our appreciation and welcome any opportunity to be of service.

TAPPI, the Salesmen's Association, the Technical Section of the Canadian Pulp and Paper Association, and The Institute of Paper Chemistry have each shown a pleasing tendency to be cooperative with our Association and this kindness is appreciated.

As usual, our largest source of support has been the suppliers to the industry. Our affiliates have given us financial support; and their representatives have given unstintingly of their time, talent, counsel and energy to help make our meetings successful—and our Association sound and progressive. As long as the industry has such a far-seeing group of people working with it in the devising and servicing of methods and equipment, it has a good chance of surviving any outside competition. May the benefits accruing from our relationship with the affiliates always be mutual.

It is a pleasure to tell you that no president could have had the benefit of more capable and active support and seasoned counsel than that given to me by our trustees, officers, directors, and committee chairmen. This assistance applies particularly to our Secretary-Treasurer.

From my vantage point, I can see the Association on the distant horizon continuing to constructively serve an ever-expanding industry—an industry that is almost as basic as food and water and one upon which the world is continuing to place a greater and greater responsibility. May the accomplishments of the Association during my tenure of office as president, made possible by the efforts of so many, serve as one more solid stepping stone to a strong and prosperous pulp and paper industry of tomorrow.

Following the President's address, proposed changes in the Constitution of the Association that had been recommended by the Planning Committee and approved by the Board of Directors, were read and adopted.

The members then adopted the report of the Resolution Committee after it was read by Harry E. Weston, chairman, who served on this committee with vice presidents James Fish and Glen Sutton.

Resolutions

WHEREAS, Production facilities are closing up gradually on a continually increasing market demand for paper and paperboard (a per capita consumption of 342 lb. in 1947) ; be it

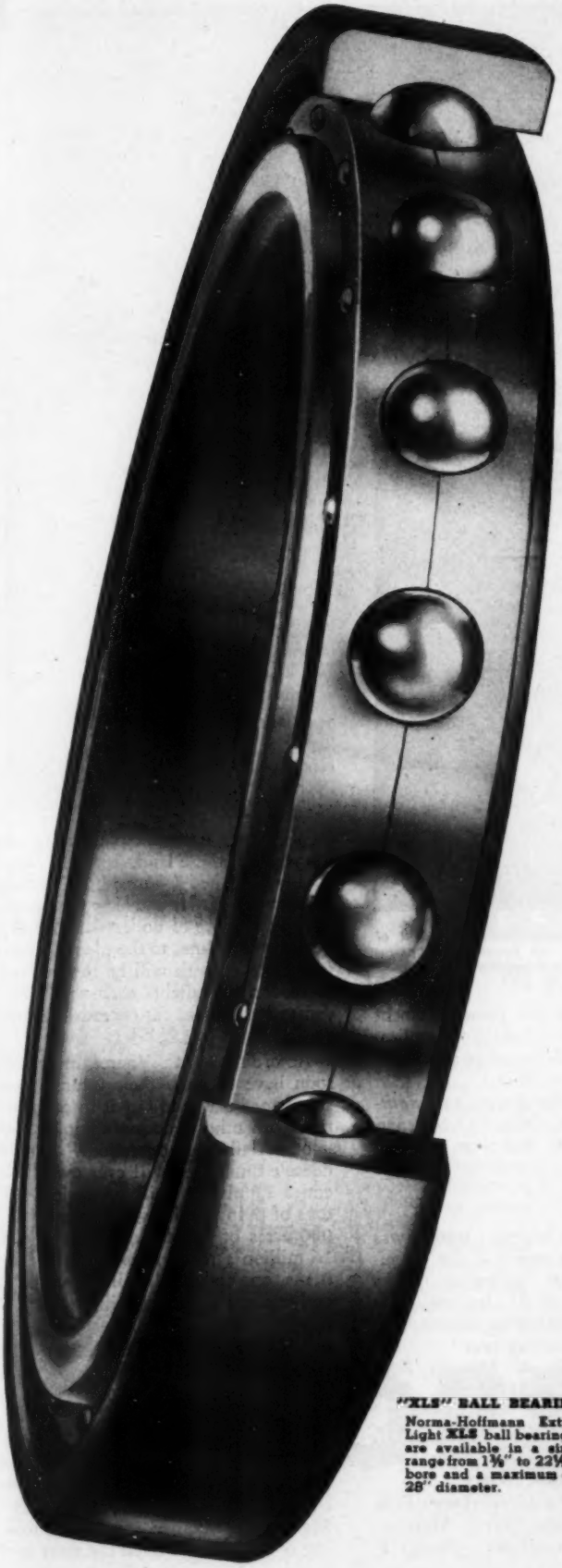
Resolved, That continued thought and study be given by the Association membership to more satisfactory control of production costs through better technology, more efficient equipment and mill layout, and through improved employee morale.

WHEREAS, the pulpwood requirements of the industry are increasing at a significant rate; be it

Resolved, That greater effort be made by the membership of the Association to obtain highest possible yield of fiber in the pulping operations that is commensurate with the end use of the pulp, to develop procedures for more efficient utilization of greater quantities of the lesser desired wood species, and to minimize fiber losses in the conversion of pulp to paper.

WHEREAS, the continued progress of the industry depends in no small way on the skill of its working force; be it

Resolved, That every member of the Association, each in his respective mill, be of such help as possible in the training of mill employees to better meet technological advances and otherwise to become better informed and more highly skilled workers.



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Precision Bearings Provide greater latitude in designs

These Norma-Hoffmann *Extra Light* Precision Ball Bearings—**XLS** types—provide the solution to cramped bearing space in machine design. In addition to the advantages of low friction, compactness and light weight, the abnormally large bores, compared to outside diameter, give designers greater latitude in designs of their equipment. They are also suitable for combined radial and thrust loads in either direction. Investigate Norma-Hoffmann *Extra-Light* Precision Bearings for your designs. Our Field Engineers will gladly aid you in the application and selection of the proper bearing for your particular designs. Write for their services and catalog.

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WHEREAS, the Association has undertaken the preparation of a series of reports and monographs on subjects of definite interest to its membership and to the entire pulp and paper industry; be it

Resolved, That this effort receive the utmost co-operation of as many members of the Association and of the Allied Industrial Affiliates as may be necessary to do a satisfactory job.

WHEREAS, the project covering the collection, editing, and publishing of data pertaining to chemicals used in the paper industry has been completed in the printing of a practical and very attractive wire-bound volume; be it

Resolved, That the Chemical Book Committee, collectively and individually, receive the commendation of the entire membership of the Association for this worthy addition to the literature of the pulp and papermaking industry.

WHEREAS, the book entitled *Preventive Maintenance in Pulp and Paper Mills* (which presents all details of a conference conducted at Middletown, Ohio, under the supervision of the Association) and a pamphlet entitled Code for Safe Operation of Paper Mill Dryers (prepared by a committee) have been published recently; be it

Resolved, That this record serve as a word of thanks to each individual who participated in any way in these activities of the Association.

WHEREAS, the Allied Industrial Affiliates of the Association, represented so ably during the past year by Frank E. Hutton as chairman, has functioned so co-operatively in the best interests of the Association, be it

Resolved, That this participation of so many firms of the allied industries receive the acknowledgment of the entire membership of the Association.

WHEREAS, John W. Bolton and Sons Company through its Third Bolton Award Contest stimulated during the past year an unusual number of manuscript entries on "My Plan for Improving the Safety Record in the Pulp and Paper Industry," the thirteen prize winning papers of which have been published and distributed by the John W. Bolton & Sons Company; be it

Resolved, That the Association membership give due recognition to this donor and to every participant in the contest—prize winner or not—for making the entire pulp and paper industry more safety conscious and a safer place in which to work.

WHEREAS, Raymond F. Bennett, as president of the Association for the past year, has so strongly energized the wide flung activities of the Association through his seemingly tireless effort and sincere interest, thus furthering markedly the accomplishments of the Association, be it

Resolved, That each member of the Association recognize this contribution of outstanding leadership.

WHEREAS, the many details connected with the management of the Association have been so splendidly handled by our secretary-treasurer, George W. Craigie, be it

Resolved, That this recognition serve as a personal testimonial to him from the entire membership.

WHEREAS, the many activities of the Association and its various divisions have been covered so adequately in *Paper Mill News,* the official publication of the Association, and other magazines of the industry; be it

Ollie W. Messner, newly elected president of The American Pulp and Paper Mill Superintendents Association

Resolved, That this pronouncement render to each of the obliging publications the grateful appreciation of the Association membership.

The report of the *Auditing Committee,* submitted by Ollie W. Messner, first vice president, was then read and adopted.

New Officers

The morning's business session was concluded with a report of the Nominating Committee presented by its chairman, William H. Brydges, past president. The following officers were elected for the coming year:

President—Ollie W. Messner, Robertson Paper Box Company, Inc., Montville, Conn.

First Vice President — Charles H. Reese, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Second Vice President—James Fish, Erving Paper Mills, Erving, Mass.

Third Vice President — Charles E. Ackley, Crown Zellerbach Corporation, Port Angeles, Wash.

Fourth Vice President—Glenn Sutton, Sutherland Paper Co., Kalamazoo, Mich.

Fifth Vice President — Gordon K. Singletary, Brunswick Pulp and Paper Co., Brunswick, Ga.

Named to the Board of Directors were past presidents, Raymond L. Barton, Michigan Paper Company, Plainwell, Mich., and E. T. A. Coughlin of Richland, Mich.

Vertrees Young Speaks on Southern Timberlands

Speaker of Wednesday morning's general conference was Vertrees Young, vice president of the Gaylord Container Corporation, Bogalusa, La., whose topic was "The Mill Executive Enters the Woods." In his address he described the executive's responsibility in procuring an adequate supply of timber. He asserted that the South is capable of producing 20 to 25 million cords of wood a year more than it now produces, while in Louisiana there are one and a half million acres of forest land that should be planted.

Mr. Young said there are 33 million acres throughout the South that have been cut clear or have less than 40 per cent stocking, which could produce the 20 to 25 million cords a year.

"Proper fire protection will help materially, but a tremendous planting job lies ahead if these lands are to be thoroughly restocked," he said. "Planting is its own reward if you have the money and the courage to undertake it. I believe the only limit to the planting program in the South will be the number of seedlings available each year. The demand at present far exceeds the supply."

According to Mr. Young, mills will soon have to grow their future wood supply or be able to buy it in competition with other wood-using industries —or curtail their operations. But he doesn't think they will ever own their entire supply. A mill producing 500 tons of pulp per day would need 750,000 acres of woodlands to do it. Of 16 million acres of forest land in Louisiana, one and a half million are bare, and five and six-tenths million are very thinly stocked and need partial planting.

Story of Boxes Told in Technicolor Movie

A highlight of the general conference was the technicolor movie, "Trees to Boxes at Bogalusa," showing the entire operation in the Bogalusa area. Mr. Young, who had directed the making of the film, narrated the story as it

LIKE TO WORK PUZZLES, MR. SUPERINTENDENT?

If you say "No", we challenge you, for every mill superintendent is eternally working puzzles.

Puzzles pop up everywhere—in the beater room—in the machine room—in the converting plant. Things going wrong. Things to adjust, to replace.

Take water. To you it is a belt to transport fiber. To you water poses problems in your Hydrapulpers, in your beaters, in your jordans, in your pumps, stock lines, and chests.

On the machine—and here is where felts come in—water removal concerns the surface tension of your felts, the pressure on them, their porosity, the speed you're running—those points and many more—each a truly scientific puzzle and ever crying for attention.

Felt manufacturing is, therefore, an art. And that's why Orr emphasizes the advantage of having an Orr representative suggest the particular kinds of felts your particular machine should have.

COMPLETE LINE OF WOOLEN FELTS: *STANDARD — untreated; ORR-CHEM — chemically-treated; COTTON WARP for cement and asbestos products.*

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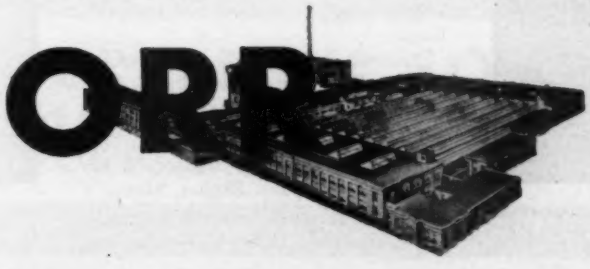
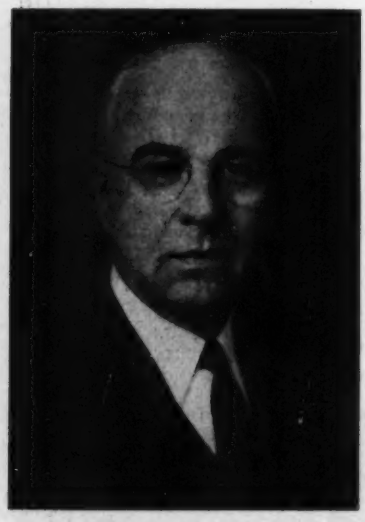


Vertrees Young (left), vice president Gaylord Container Corp., spoke at the General Conference session Wednesday morning. Shown with him (right) is Raymond F. Bennett, Ecusta Paper Corp., and presiding president of the Association

was shown by its producer, Walter L. Glass, of F. C. Huyck & Sons, Albany, N. Y. Every inch of its 3300 feet of 16 mm. film, including descriptive titles, was a revelation and education in the planting and cutting operations in Southern forestry, the handling and transportation of wood to the mill, its manufacture into pulp, paper and paperboard, and final conversions into bags and boxes.

J. M. Murray, pulp and paper mill superintendent of Gaylord Container Corporation, presided at this conference.



George W. Craigie, secretary-treasurer of the American Pulp and Paper Mill Superintendents Association

Affiliates Hold Annual Dinner and Election

The annual dinner of the Allied Industrial Affiliates and their representatives was held at the Roosevelt Hotel on the evening of May 18. It was presided over by Frank E. Hutton, of The Babcock & Wilcox Company, New York, who was chairman of the Industrial Affiliates Committee for the last year. A new committee consisting of the following ten members was nominated and elected for the coming year:

Chairman—F. F. Frothingham, Bird Machine Company, South Walpole, Mass.

First Vice Chairman—F. A. Soderberg, General Dyestuff Corporation, New York, N. Y.

Second Vice Chairman—Allan Hyer, Bagley & Sewall Company, Watertown, N. Y.

R. M. Upright, Dow Chemical Company, Midland, Mich.

Edward L. Lukemire, Dicalite Company, Los Angeles, Calif.

A. C. Clarke, John W. Bolton & Sons, Inc., Lawrence, Mass.

J. L. Van Nort, Reliance Electric and Engineering Company, Cleveland, Ohio.

Norman B. Scott, The Orr Felt and Blanket Company, Piqua, Ohio.

R. E. Briggs, Jeffrey Mfg. Company, Columbus, Ohio.

James M. McAlear, Mason-Neilan Regulator Company, Boston, Mass.

The Associate Secretary-Treasurer of the Association, Harry E. Weston, was elected secretary-treasurer of the Industrial Affiliates Committee.

Following the dinner, Walter L. Glass, of F. C. Huyck & Sons, Albany, N. Y., showed interesting and entertaining colored movies of the Mardi Gras Carnival and Ball, and other films including the 1947 New York-Brooklyn World Series baseball games.

GROUP MEETINGS

Group meetings started on Wednesday afternoon and continued throughout Thursday. Twenty-seven papers and four forums were presented during the nine sessions. Listed herewith are the subjects of the papers, the authors, and the sessions for which they were scheduled:

Wood Room and Woods Operations

Chairman—J. M. Murray, Gaylord Container Corporation.

"Woodyard Chains," J. W. Sears, Link-Belt Company.

"General Trends in Solving Chipping Problems," C. L. Durkee, D. J. Murray Company.

"Wood Room Design," Alfred Suter, Gaylord Container Corporation.

"Electric Drives with Fluid Couplings for Materials Handling Equipment and Power Driven Machinery," F. W. Atz, Link-Belt Company.

Mill Maintenance

Chairman—Cedric A. Stone, Champion Paper and Fibre Company.

"Application and Maintenance Techniques for Mill Insulation," Utley W. Smith, Magnesia Insulation Mfrs. Association.

"Getting the Maximum Flexibility from Our Engineering and Mainte-

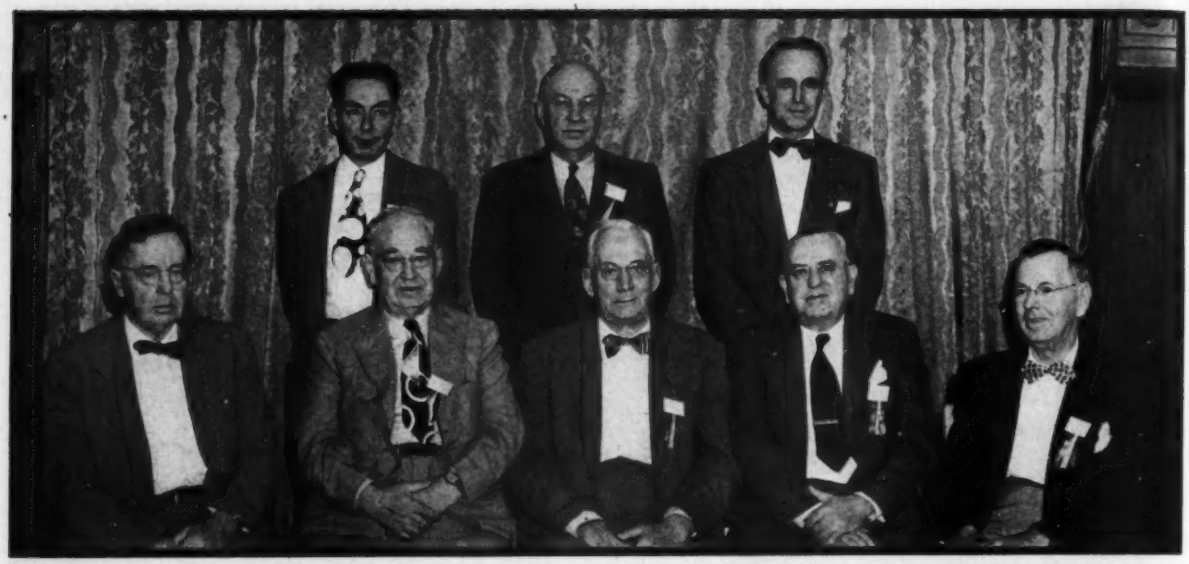
Harry E. Weston, associate secretary-treasurer of the American Pulp and Paper Mill Superintendents Association

PERKINS

DIAMOND JUBILEE

Perkins Calender Rolls are the result of the longest and broadest experience. No Calender is better than the rolls in it.

B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASSACHUSETTS



Shown here are the past presidents of the Superintendents Association who were present at the New Orleans Convention: (Left to right) Seated—Killey E. Terry, 1935; John H. O'Connell, 1922-1923; Fred C. Boyce, the first president, 1919-1921; E. T. A. Coughlin, 1926; Wm. H. Brydges, 1933; Standing—Raymond L. Barton, 1945-1946; Oscar Stamets, 1942; and Howard H. Harrison, 1940. (Now a past president, but not shown in this group is Raymond F. Bennett, 1947, who presided at the New Orleans Convention.)

nance Department," William P. Jordan, Ecusta Paper Corporation.

"Fire Prevention and Protection in Pulp and Paper Mills," J. P. Hamilton, Associated Factory Mutual Fire Insurance Company.

"Use of Electric Welding in Pulp and Paper Mills," A. C. Porter, Woodward Wight and Company, representing Lincoln Electric Company.

"Benefits of the Use of Special Alloys in Pulp and Paper Mill Maintenance," H. O. Teeple, International Nickel Company.

"The Care and Repair of Rubber Covered Equipment in Pulp and Paper Mills," H. H. Burrows, Manhattan Rubber Company.

Coated Papers

Chairman — James R. Simpson, Champion Paper and Fibre Company.

"Supercalendering of Coated and Machine Coated Papers," Ward Wheeler, Wheeler Roll Company.

Forum: "Coating Techniques"

Panel Members:

Moderator—O. W. Callighan, Edgar Brothers Company.

James Simpson, Champion Paper and Fibre Company.

Dr. George Cramer, Sinclair & Valentine Company.

E. T. A. Coughlin, Charles T. Main, Inc.

Howard B. Richmond, Consolidated Water Power and Paper Company.

Benjamin R. Newcomb, John Waldron Company.

Edward P. Gillan, Anheuser-Busch, Inc.

Ward Wheeler, Wheeler Roll Company.

Prof. Reed, Lithographic Technical Foundation.

Morris Kantrowitz, U.S. Government Printing Office.

Fine Paper and Tissue

Chairman—James Fish, Erving Paper Mills.

Co-Chairman—Carl Welte, Champion Paper and Fibre Company.

"A New Approach to Slime Control," Frederick A. Soderberg, General Dyestuff Corporation.

Forum: "The Modern Paper Machine"

Panel Members:

Moderator—Carl Welte, Champion Paper and Fibre Company.

J. Wesley Joslyn, Sandy Hill Iron and Brass Works.

Frank Sanger, Pusey & Jones Company.

Leon E. Smith, Downingtown Mfg. Company.

H. C. Moore, Beloit Iron Works.

G. A. Peterson, Rice Barton Corporation.

C. H. Vickery, E. D. Jones & Sons Company.

L. W. Isham, Bagley & Sewall Company.

Paul Boronow, Valley Iron Works Company.

R. L. Kutter, Black-Clawson Company.

Richard Temple, The Moore & White Company.

Sulphite

Chairman—Harold A. Skinner, Marathon Corp.

"Petroleum Base Pitch-Control Additive for Sulphite Pulping," H. E. Corbin and W. A. Beman, Socony-Vacuum Oil Co.

"Askania Thin Stock Consistency Regulator," Wilbur F. Pray, Askania Regulator Co.

"Application of Remote Control Devices to Diaphragm Valves," R. T. Kidde, Hills-McCanna Co.

Board

Chairman—Harry E. Hadley, The Gardner-Richardson Co.

"The Application of Felts to Board Machines," Larry Woodside, Albany Felt Co.

"Some New Thoughts Regarding the Cylinder Machine," Jacob V. Edge, Downingtown Manufacturing Co.

Forum: "Board"

Panel Members:

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No two piping systems are alike . . . and, analyzing requirements from the blueprint is like analyzing a fingerprint—it's a job for an expert.

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Materials are selected on the basis of conditions to be met, expertly shop fabricated in a completely equipped, modern plant, and erected by trained and experienced craftsmen.

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Pittsburgh Piping
AND EQUIPMENT COMPANY
10 Forty-Third Street—Pittsburgh, Penna.

Newly-elected president of the Association, Ollie W. Messner (center) is shown with Charles H. Reese, left, now first vice president, and Glen Sutton now fourth vice president

Moderator—Harry E. Hadley, Gardner-Richardson Co.

John R. Stinson, Hummel & Downing Co.

Walter F. Wolfe, Mac Sim Bar Paper Co.

Kraft

Co-Chairmen—Claude Metcalf, Brown Paper Mills Company, and Gordon Singletary, Brunswick Pulp and Paper Company.

"Cooking by Means of Automatic Gas-Off and Time Cycle Control," Joseph F. Keyes, North Carolina Pulp Co.

"Some Modern Concepts of Stock Preparation," Tany Agronin, Shartle Bros.

"Recovery of Chemical Losses from Recovery Furnace Stack Gases by Cottrell Electrical Precipitators"—L. M. Roberts, C. E. Beaver and W. N. Blessing, Research Corp.

Power

Chairman—Charles Reese, Nekoosa-Edwards Paper Co., Inc.

"A New Appraisal of the Fuel Situation," John Van Brunt, Combustion Engr. Co. (Read by H. D. Nickle, of the same company, and released through the courtesy of the Midwest Power Conference.)

"The Chemical Cleaning of Boilers and Paper Processing Equipment," J. T. Browning, Dowell Incorporated.

"The Modern Paper Machine Drive," George W. Plaisted, General Electric Co.

"Protection of Heavy Electrical Power Circuits," W. M. Emmons, Westinghouse Electric Corp.

Forum: "Safe Operating Pressure for Paper Machine Dryers"

Panel Members:

Moderator — T. J. Jerardi, Black-Clawson Co.

Sam T. Weber, Black-Clawson Co.

G. H. Suhs, Sorg Paper Co.

Nels H. Sandberg, Waldorf Paper Products Co.

Graphic Arts

Chairman — Robert W. Pattison, American Writing Paper Corp.

"Ink and Paper," Dr. George Cramer, Sinclair and Valentine Co. (A discussion of Letterpress, Lithography, and Gravure.)

"New Papers Developed During the War," Morris Kantrowitz, U. S. Government Printing Office.

"Lithography," Prof. R. F. Reed, Lithographic Foundation. (Indicating specifications for paper for Lithographic process.)

[*Abridgments of some of the above papers will be found in the section "Convention Papers . . . Abridged" of this and successive issues.*]

Dinner Meeting Topped by Good Fellowship

On Thursday evening the ladies gathered with the men at a joint dinner in the Grand Ballroom of the Roosevelt. The toastmaster, Frank E. Hutton, of The Babcock & Wilcox Company, and the master of ceremonies, John Eversman, of Ecusta Paper Corporation, set the stage for a relaxing and entertaining evening.

President Bennett and his program committee deserved all of the praise that was manifested by the diners for a capital dinner and stage show. All of the numbers on the program were high class, topped by the violin solos of Mr. Eversman accompanied by Mary Glass at the piano, and vocal solos by Lucille Heffner. Community singing was led by Harry Hulmes. Emile Parra, eccentric dancer and singer, was a dynamo of song and enthusiasm.

I.B.M.P. Hold Breakfast—Initiate Pres. Bennett

The men assembled early Friday morning in the Grand Ballroom for the hilarious Men's Breakfast, which was presided over by Judge Ray Smythe, president of the International Brotherhood of Migratory Peddlers. The I.B.M.P. was formed in 1941 by a group of Pacific Northwest Supply men serving the pulp and paper industry. Greater service to the industry is the keynote of its purpose.

The Judge's assistants from the West coast who joined him in his amusing antics were Larry K. Smith, of *Pulp & Paper;* A. G. Natwick, Crown Zellerbach Corporation; and M. J. Maguire, Hercules Powder Company. The major event of the breakfast was the initiation into honorary membership of President Raymond F. Bennett.

Two Luncheons Held—Men Hear Hartley and Women Take River Trip

Following the pattern of last year's program, two luncheons were held on Friday, May 21. Toastmaster of the Men's Luncheon in the Grand Ballroom was Charles Reese, second vice president. The speaker was the Honorable Fred A. Hartley, Jr., co-author of the Taft-Hartley Bill, who presented a timely discussion of the labor law.

The congressman said that he was going to propose legislation "to make it a federal offense to interfere with the civil rights of a worker to go to his job." This provision, he declared, was in the original draft of the labor law submitted by the House but was modified out of the final legislation in conference with the Senate. He explained it would not be a "scab law" because the law would protect only a worker who already was employed by management and not new employees brought in to break up a strike.

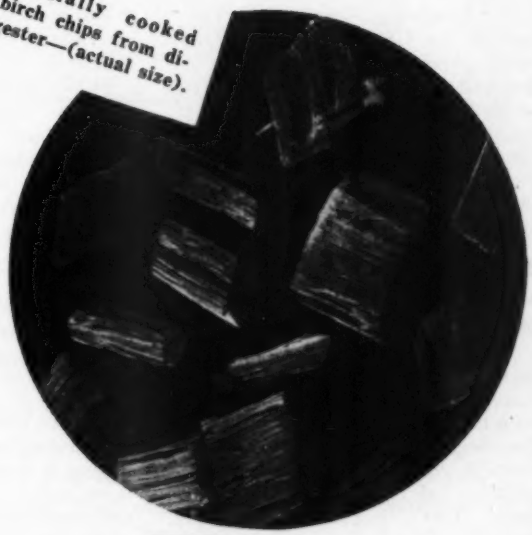
Speaking of the Taft-Hartley Law, he asserted that "its anti-closed shop provision merely tells the unions to open up too, instead of creating monopolies they profess to abhor." The prohibition of secondary boycotts, jurisdictional strikes and featherbedding is also working out satisfactorily since the law took effect last August 22, he added.

One instance in which Mr. Hartley thinks the Act may have been amiss is the provision that requires labor leaders only to sign affidavits denying Communist affiliations. "We should have included the employers in that too. Many labor leaders considered this an affront to their integrity," he said. "But there's no denying that it enabled the rank and file to rid them-

from birch and aspen *now* come semi-chemical pulps

1

Partially cooked birch chips from digester—(actual size).



ABUNDANT and fast growing, these hardwoods are capable of vast increases over standard yields after sodium sulphite treatment followed by SPROUT-WALDRON refining.

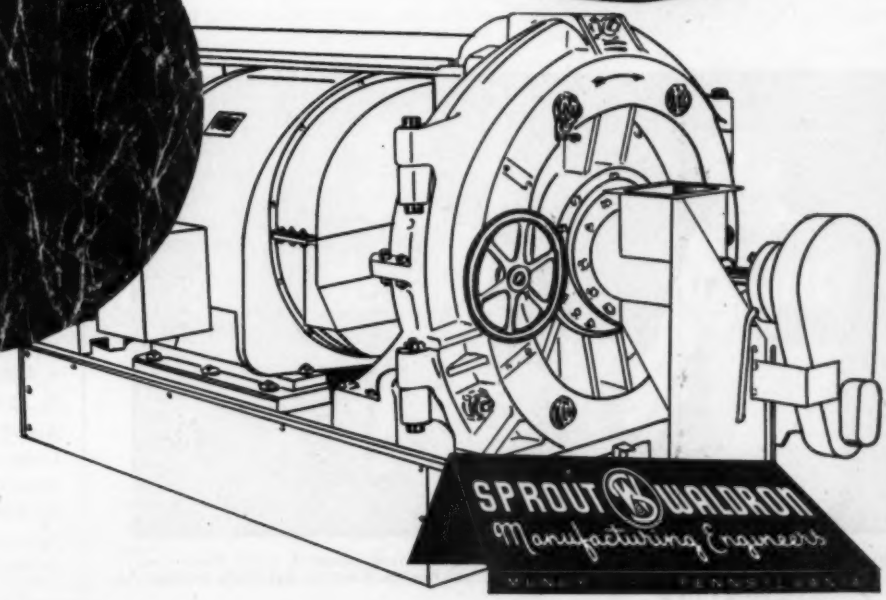
Readily bleached and with high initial strengths, such pulps may be substituted for bisulphite in book and comparable grades.

Low power and high increments of clean, uncut fibers, offer inducement to serious consideration.

SPROUT-WALDRON offers you its technical knowledge and experience in consultation.

2

Screened birch pulp from Sprout-Waldron Refiner (magnified 15-X).



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Newly-elected first vice-president Charles H. Reese, who presided at the Men's Luncheon on Friday

The Hon. Fred A. Hartley, Jr., co-author of the Taft-Hartley bill, was guest speaker at the Men's Luncheon

selves of a lot of Communistic leaders."

The delightful Ladies' Luncheon was held in the University Room of the hotel. Immediately thereafter the ladies participated in a gay Bingo Party conducted by John Eversman. Earlier features of the ladies' program were a conducted walking tour of the Old French Quarter, a luncheon in the colorful Patio Royal, and a 2½ hour excursion on the Mississippi River.

Employee Training and Labor Relations Subjects of Friday Gen. Sessions

Two important general conferences occupied the time of the delegates on Friday. The morning conference dealt with the subject "Employee Training." Presiding at the session was A. G. Natwick, of Crown Zellerbach Corporation, who presented a paper entitled "The Crown Willamette Paper School." Descriptions of the methods of their respective companies were presented by Stanley Stumpf, Johns-Manville Corporation; W. A. White, Jr., Shartle Bros. Machine Company; and J. H. Groves, Union Bag & Paper Corporation.

At the afternoon conference, DeLoss Walker, industrial relations counselor of Chicago, presented an informative address on labor relations. Mr. Walker, who spoke at the 1947 convention, presented much new material from his field.

Mr. Walker declared that both labor and management must be "educated to the fact that they are not working for themselves, but for the customer. The answer to every problem we have today comes down to production. When we produce more products of better quality at less cost, then we'll have them licked. Workers will share in the profits of increased production, and at the same time profit by lower prices."

Mr. Walker explained that his mission is to get management to set up schools for their workers in which labor can be educated to the futility of using force to settle grievances.

"You can't win with force," he asserted. "A strike has never settled anything. Time lost is lost forever. It can never be made up by anyone."

Get-Together Party and Banquet

Again this year the Industrial Affiliates were hosts of the Superintendents and their ladies at the Fifth Annual Get-Together Party. A beautiful corsage was presented to each lady, and gay music set a delightful background to the festivities. Following this pleasant prelude, everyone gathered in the Grand Ballroom for the social highlight of the convention, the Annual Banquet. President Raymond F. Bennett was toastmaster and the principal speaker was Harry H. Straus, president of Ecusta Paper Corporation.

Mr. Straus spoke on the subject "Where Are We Going?" following the general theme of free enterprise. From a flashback to World War I, he brought the industrial picture down to the present time, touching upon the effect of internationalism.

As in former years, the banquet was followed by a gay evening of dancing to the music of Johnny DeDroit's Orchestra.

Raymond F. Bennett, Association president, who was toastmaster at the banquet on Friday evening

Harry H. Straus, president, Ecusta Paper Corp., who was the guest speaker at the banquet

PAST PRESIDENTS

American Pulp and Paper Mill Superintendents Association

Fred C. Boyce	1919-1921
John H. O'Connell	1922-1923
Nelson R. Davis	1924-1925
E. T. A. Coughlin	1926
Fred J. Rooney	1927-1928
Benjamin T. Larabee	1929
James G. Ramsey	1930
Carl Magnus	1931
Roy H. Kelly	1932
William H. Brydges	1933
Herbert T. Randall	1934
K. E. Terry	1935
Charles Champion	1936
Frank J. Timmerman	1937
Brydon D. Millidge	1938
F. LeRoy Zellers	1939
H. H. Harrison	1940
Arthur B. C. Drew	1941
Oscar Stamets	1942
Grover Keeth	1943
Stanford G. Blankinship	1944
Raymond L. Barton	1945-1946
Homer H. Latimer	1947

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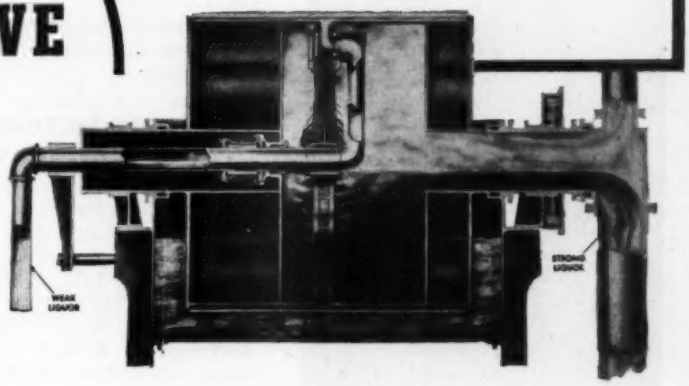

We recommend the Oliver Ringvalve Filter for the following applications:

- **Sulphite, Sulphate or Soda Washing**
- **Bleach Washing**
- **Decker-Washing**
- **Deckering**
- **High Density Thickening**

We recommend its purchase for your mill not only because it has thoroughly proved its superiority but because it's not a "cramped" filter. There is plenty of space between drum and vat for pulp circulation. The vat is designed for "through the floor" installation.

And as a reminder of its operating features here are a few: wide submergence range; operable with barometric leg; low flow resistance; can take peak loads in stride; uniform sheet and high washing efficiency.

Yes, we recommend the Oliver Ringvalve for any of the operations noted above. Many mills are glad, today, they accepted our Ringvalve recommendations.

OLIVER UNITED FILTERS INC.

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San Francisco 11,
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Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, California
2900 Glascock Street

Sales and Manufacturing Representative:
E. Long Limited
Orillia, Canada

Factories: Oakland, Calif. • Hazleton, Pa. • Orillia, Canada • Melbourne, Australia

DR. J. REICHERT TO HEAD EMPIRE SECTION OF TAPPI

Officers for the 1948-1949 season were unanimously elected at the regular monthly meeting of the Western New York Group Empire State Section of TAPPI on May 12 in Niagara Falls. The new officers are:

General Chairman—Dr. J. Reichert, of E. I. duPont de Nemours and Company, Niagara Falls.

Dr. J. Reichert

Program Committee—G. H. Rand, Jr., of International Paper Company, Niagara Falls.

Dinner Committee—G. Storin, of the Niagara Alkali Company, Niagara Falls.

Attendance Committee—W. Day, of Kimberly-Clark Corporation, Niagara Falls.

Publicity Committee—I. Earle, of the Upson Company, Lockport.

Following the election, Dr. A. H. Nadelman, of International Paper Company and general chairman of the 1947-1948 season, introduced the speaker of the evening, R. J. O'Brien, plant manager of Moore Business Forms, Inc., Niagara Falls. His topic was "Use Requirements of Paper from a Converters Point of View."

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OHIO SECTION OF TAPPI ANNOUNCES NEW OFFICERS

The first meeting of the newly elected officers and executive committee of the Ohio Section of Tappi was held at the Hotel Manchester in Middletown, Ohio, May 27.

Chairman Phil S. Cade, of the Harding-Jones Paper Company, presided. Other officers are:

Vice Chairman: Arthur Thurn, Champion Paper & Fibre Company.

Recording Secretary: H. A. Smith, The Mead Corporation.

Corresponding Secretary: S. R. Holmes, Gardner-Richardson Company.

Treasurer: R. D. McCarron, Stein Hall Company.

Executive Committee: Ken Geohegan, Howard Paper Mills, Inc.; E. C. Hendrickson, The Mead Corporation; C. D. Roese, The Wrenn Paper Company; D. M. Yost, Sorg Paper Company; and H. H. Harrison, The Crystal Tissue Company.

Program Chairman: Don Goodman, Sorg Paper Company.

▼

PAC. COAST SECTION OF TAPPI ELECTS OFFICERS

Harold C. Wall, chemist at the Longview Fibre Company (Longview, Wash.), was elected chairman of the Pacific Coast Section of TAPPI at the annual meeting held in May at Gearhart, Oregon. He succeeds Dr. Joseph L. McCarthy, of the University of Washington. Walter Holzer was named vice chairman; R. M. True, secretary-treasurer; and Ben Natwick, member of the executive committee.

The program included a discussion of the Taft-Hartley Act by Rev. James A. Fogerty, of Portland University, a talk on chemical pulping of Douglas fir by Dr. John M. McGovern, a talk on Northwest forest resources by W. B. Greeley, and a discussion of job evaluation by J. M. Pedford.

▼

PLASTICS COMMITTEE OF TAPPI PLANS CONFERENCE

The Plastics Committee of the Technical Association of the Pulp and Paper Industry will sponsor a two-day conference at the Institute of Paper Chemistry, Appleton, Wisconsin, on August 16-17. This conference will immediately precede the Fundamental Research Conference on the Physical Nature of the Components of Wood to be held at Madison, Wisconsin, on August 18-20. The two conferences are being held consecutively in Wisconsin as a convenience to the large number of industry and university men who will be interested in attending both meetings.

The program on August 16 will be devoted to a symposium on the nature of the adhesion of resins to cellulose and will be under the direction of Herman Mark of the Polytechnic Institute of Brooklyn. The meeting on the following day will be devoted to a discussion of plastic coating of paper under the chairmanship of R. H. Mosher of the Marvellum Company, Holyoke, Massachusetts. This meeting will be under the general chairmanship of Edwin C. Jahn of the New York State College of Forestry.

The Conway Hotel in Appleton has indicated that it can accommodate about 100 persons for the nights of August 15-16. Reservations should be made now with the hotel. The Appleton Hotel in Appleton, the Menasha Hotel in Menasha, and the Valley Inn at Neenah can also accommodate a number of people who make reservations in time.

▼

P. O. DEITSCH PRESENTS GUMMED TAPE PROGRAM TO PAPER AND TWINE ASS'N

Philip O. Deitsch, managing director of the Gummed Industries Association, presented the Gummed Sealing Tape Division's new educational program on better package sealing to the Paper and Twine Association at its annual convention at French Lick, Indiana, on June 11.

His talk explained all phases of this nation-wide program, which is designed to help shippers everywhere cut shipping damage losses by doing a better package sealing job (Cf. P.I. and P.W., April, 1948, p. 104). The presentation included a showing of the new

Philip O. Deitsch, managing director of the Gummed Industries Association

sound slide film, "How to Seal It Right with Gummed Tape." Mr. Deitsch is confident that this film, together with the other elements of the Association's five-point program, offers a practical solution to the problem of shipping damage losses, which last year reached an all-time high of over $200,000,000. As this problem is of vital concern to the Paper and Twine Association, the presentation was received with great

interest by those who attended the French Lick meeting.

This new educational campaign consists of the following five closely related parts: the sound slide film, a large pictorial wall chart, and a pocket size instruction manual, together with an advertising campaign and direct mail program to help shippers all over the country take advantage of these employee training aids.

Mr. Deitsch reported that the program is well under way, and is gaining increased momentum every day. Hundreds of requests for program presentations have been received from shippers and paper merchants, and showings are now being made all over the country.

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▶▶▶ SCIENTISTS AND engineers from many parts of the world participated in the Pittsburgh International Conference on Surface Reactions which was held at the Mellon Institute for Industrial Research in Pittsburgh, June 7-11. Technical sessions were held in the mornings and evenings and the afternoons were spent on visits to Pittsburgh research laboratories.

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COMING EVENTS

Aug. 10-13—First Western Packaging Exposition and Conference on Packaging, Packing and Shipping at the Civic Auditorium, San Francisco, Calif.

Aug. 25-27 — TAPPI (National) fall meeting, Fundamental Research Committee, Madison, Wis.

Sept. 4-6—Meeting of Technical Section, Canadian Pulp & Paper Association, Harrison Hot Springs, B.C.

Sept. 13-17—Third Instrument Conference and Exhibit, Philadelphia Convention Hall, Philadelphia, Pa.

Sept. 27-29 — TAPPI (National) fall meeting, Mechanical Pulping Committee, Poland Springs, Me.

Oct. 11-13—TAPPI (National) fall meeting, Testing Divsion, Pittsburgh, Pa.

Oct. 12-16—Fifth National Chemical Exposition by the Chicago Section of the American Chemical Society, Chicago Coliseum, Chicago, Ill.

Oct. 18-22—Thirty-sixth Annual Safety Congress, Chicago, Ill.

Oct. 25-28—TAPPI (National) fall meeting, Third Engineering Conference, Buffalo, N.Y.

Oct. 28-30—Meeting of National Paper Trade Association, Hotel Stevens, Chicago, Ill.

STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at the Chicago Bar Association, Chicago, Ill. (except July and August).

MATERIAL HANDLING *News*

Electric Fork Trucks and Gas Fork Trucks — CLARK BUILDS BOTH

It is as true in the field of materials handling as it is in the field of medicine that a completely objective and unbiased approach is essential to any search for facts.

In many installations gas-powered equipment does the best possible job; and Clark gas-powered machines do these "best possible" jobs in the best possible manner. Many gas-powered Clark machines remain in operation after 20 years of continuous service—ample proof of their sturdy excellence.

Gas-powered carloader with HI-LO-STACK clears car doors easily, tiers to 11 feet.

In many other installations it is clear that electric battery-powered machines will serve most efficiently and economically—and in these instances Clark sales engineers recommend Clark electrics.

Electric fork truck loads palletized cases of canned goods on trailers.

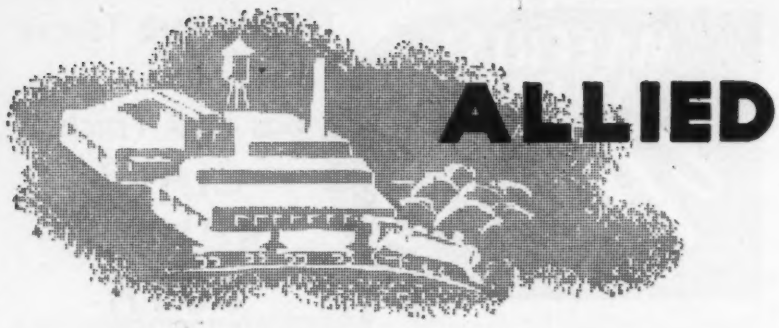
Clark undertook the manufacture of electric battery-powered fork trucks with a conviction that it could build a better machine than it could find on the market, and at a lower cost. Exclusive initial economies which Clark foresaw and achieved—and which it affords Clark users—resulted from Clark's mass production of both gas and electric machines as well as of most of their major components, and from its unparalleled pattern of parts interchangeability. These are basic advantages immediately apparent to seasoned production men.

It must be equally apparent—that whether Clark's recommendation is for gas-powered equipment or for electric battery - powered equipment, it is based on *facts*, and is free of prejudices arising naturally out of a one-line approach.

We believe that it will pay you to CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED **FORK TRUCKS** AND INDUSTRIAL TOWING TRACTORS

CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 22, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD



WYANDOTTE CORP. HONORS 293 FAMILY COMBINATIONS

A personnel policy which encourages the development of family teams of employees has proved successful at Wyandotte Chemicals Corporation, Wyandotte, Michigan, according to President E. M. Ford, who is the fifth of his family to head its enterprises. His great-grandfather, Captain J. B. Ford, founded Michigan Alkali in 1890 and the J. B. Ford Company in 1898. All of the present officers of Wyandotte have served an active apprenticeship of several years either in the production or sales departments of the Company.

A recent issue of the company employee magazine featured some of the 298 father-son, father-daughter, and father-son-daughter combinations. One picture showed the four generations of William Sharlows, three of whom have already served the Wyandotte organization for a total of 62 years. While some of the family teams cling to one type of operation, the wide variety of steps in the production of chemicals and specialized cleaning materials permits other families to follow several different trades. Such is the case of the Sharlows, for one worked on Caustic Soda production, one works in the massive boiler house at North Plant, and one helps service the hundreds of miles of pipe needed to carry the more than 142 million gallons of brine and processing water consumed each day at Wyandotte plants.

E. M. Ford, president Wyandotte Chemicals Corporation

These Sharlows are one of the 298 father-son and father-daughter combinations now helping produce Wyandotte chemicals and specialized cleaning materials. Any way you read—left to right, or up and down—the name is William Sharlow. Great grandfather, grandfather and father all work for Wyandotte; their service totals 62 years. And William—now aged six months—probably will work for the company, too, when he is through school

▼

▶▶▶ THE OPENING OF a Chicago sales office with Beldon S. Tucker as district sales manager and the appointment of Bruce Hetler as distributor in Grand Rapids, Michigan, have been announced by Economy Pumps, Inc., Hamilton, Ohio. Mr. Tucker formerly was in charge of sanitary works construction for the Institute of Inter-American Affairs in Brazil. Mr. Hetler for a time was member of the technical committee of the Hydraulic Institute.

▼

WHITING CORP. ACQUIRES SPENCER & MORRIS, INC.

The Whiting Corporation of Harvey, Illinois, has taken over the business and plant of Spencer & Morris, Inc., of Los Angeles, California, and will continue the manufacture of the tramrail-type Materials Handling Systems which Spencer & Morris have distributed widely during the past quarter century. The plant will be operated as the Spencer-Morris Division of the Whiting Corporation.

S. H. Hammond, president of Whiting Corporation, announces that the purpose of the present expansion is two-fold. It broadens the Whiting line of materials handling equipment to include the California company's tramrail systems, and it provides Whiting with west coast manufacturing and assembling facilities.

Whiting Corporation expects to continue the Spencer-Morris efforts in the studio door field, and also to make available a certain amount of plant capacity for general job shop manufacturing.

▼

GILBERT KAHN ORGANIZES SERVICE FOR CHEMICAL AND ALLIED INDUSTRIES

Gilbert B. Kahn, for many years connected with the Consolidated Products Company, New York, and well known in the chemical and allied industries, has now set up his own organization for buying, selling, appraising, and liquidating machinery, equipment and complete plants in those fields. Offices and facilities are located at 75 West Street, New York 6, New York.

A practical engineer with twenty years experience in buying and selling used chemical and process equipment, Mr. Kahn with his associates will serve

EYES ON TOMORROW..

...for the complex *flow control needs* of Modern Industry

Fig. 150 — 150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

Fig. 500 — 125-pound Bronze Gate Valve with screwed ends, screwed-in bonnet, inside screw rising stem and tapered wedge: solid in sizes ¼" to ⅜", incl.; double in sizes 1" to 3", incl.

Fig. 1893—125-pound flanged end Gate Valve designed especially for Paper Mill Service. Body, bonnet and yoke are cast of 3% Nickel Iron; stem and screwed-in seat rings are of 18-8S Mo.; solid wedges are made of Ni-resist.

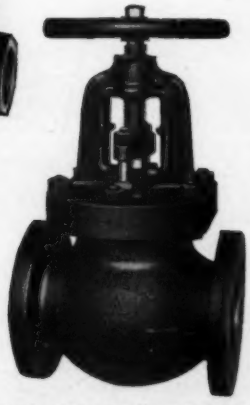


Fig. 241—Large 125-pound Iron Body Bronze Mounted Globe Valve. Made in sizes 2" to 16", inclusive. Has outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron.

Throughout more than a hundred years of making valves, The Wm. Powell Company has continually had its "eyes on tomorrow"—anticipating the future flow control requirements of industry.

This foresight was responsible for Powell's introduction of the first regrinding globe valve back in 1865. The design on which the patent was granted is shown above.

Again, more than twenty years ago, Powell had a vision of the miracles to come in the chemical and process industries. The Powell Special Design and Alloy Valve division was established and ever since, as the demands have multiplied for valves to handle ever higher pressures and temperatures and a constantly increasing variety of corrosive media, Powell has always been ready with the valves to satisfy them.

Today there's a Powell Valve for every industrial flow control requirement and, as new demands arise, Powell will be ready to meet them.

The Wm. Powell Company
Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

these industries in every way, and finance undertakings involving from one machine to complete operating plants. Long identified with the export phase of used machinery, Mr. Kahn has also announced plans to set up an export department.

▼

▶▶▶ INTERESTS IN The Biggs Boiler Works Company, Akron, Ohio, have been disposed of by B. R. Barder, president, to capital represented by T. Hall Keyes, chairman of the board; K. McKinley Smith, president; and T. E. Krizanek, executive vice president and general manager. Mr. Krizanek contributes more than twenty years' experience in manufacturing and industrial operation.

▼

LINDSAY PUBLISHES ITS CHRONICLE 1939-1947

The activities of The Lindsay Wire Weaving Company, Cleveland, from 1939 through 1947 have been briefed and published in the form of an attractive and convenient booklet.

This interesting chronicle was written by Harry H. Field, Lindsay vice president and treasurer. It is done in the nature of a sequel to the history of the first thirty-six years of the company. That work was issued just at a time when war waves were about to encircle the globe.

This interesting story not only records exactly what the company accomplished during that period, but it brings in the names of the men who contributed to those accomplishments. This includes men in service and the company's wartime accomplishments. A complete list of company employees as of January 1, 1948, is given.

There are illustrations of the plant and the men who are responsible for its operation.

▼

LINK-BELT MOVES FROM SCHENECTADY TO ALBANY

A district sales office has been opened in Albany, New York, by the Link-Belt Company, Chicago. District sales manager is J. Charles Bullock with headquarters at 309-310 First Trust Company Building, 444 Broadway, Albany 7. Mr. Bullock had been serving as district sales manager at the Schenectady office which is now discontinued.

J. Charles Bullock

Mr. Bullock started his Link-Belt career at the company's Dodge plant in Indianapolis in 1935. He was district sales engineer at the Link-Belt Ewart plant from 1942 to 1945, and district sales engineer at the company's Atlanta plant from 1945 to 1948.

▼

▶▶▶ A CLEVELAND OFFICE has been opened by Franklin F. Bogardus, district sales manager for Roots-Connersville Blower Corporation (Connersville, Ind.). A member of the Connersville plant since 1924, Mr. Bogardus will cover about the same territory previously handled from the factory.

▼

CLARK ASSOCIATES SET UP PLANT COST CONTROL DEPT.

Frederic C. Clark Associates, consulting engineers, have announced the establishment of a Plant Cost Control Department under the direction of Miss Margaret Montgomery, a former associate of the late George A. Ware, who developed the Cost Engineering Service for the American Paper & Pulp Association.

Since Mr. Ware's death, there had been many expressions of concern that the service which he had performed for so many years might come to an end. However, the work will be continued by Frederic C. Clark Associates under Miss Montgomery, whose ability and thorough knowledge of the subject are well known.

The service includes:

1) Surveys and critical analyses of cost accounting and production control procedures,

2) Consultation with management regarding the status of company systems and improvements necessary,

3) Installation of improved methods,

4) Development of standards of performance, budgetary control, and standard costs,

5) Development of concise reports for management.

▼

DIAMOND ALKALI CO. AWARDS SERVICE PINS TO 339 VETERAN EMPLOYEES

Inaugurating an employee service recognition program on a nation-wide basis to cover personnel of its eleven plants, Diamond Alkali Company on May 19 awarded service pins to 339 employees from its Painesville, Ohio, plant and general headquarters in Cleveland, who have served the company continuously for periods ranging from 10 to 35 years.

Combined service of this group receiving the diamond-shaped mementos from President Raymond F. Evans and other Diamond operating executives totals nearly 7,000 years.

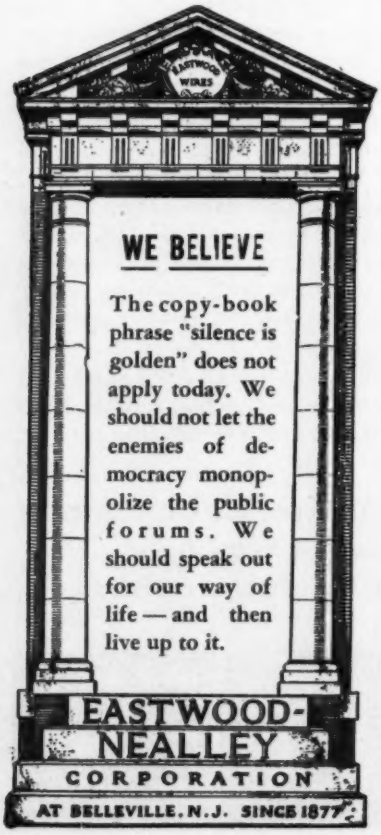
The ceremony marked the first time that the awards were made jointly to veteran employees from Diamond Alkali's Painesville plant, largest of its eleven facilities across the country producing both basic and specialized alkalis, and the company's general headquarters, which were transferred from Pittsburgh to Cleveland in March. This nation-wide service pin plan is an outgrowth of the program established in Painesville in 1941.

▼

▶▶▶ THE ACQUISITION OF the Hydraulics Division of the Airex Manufacturing Company, located in Long Island, New York, has been completed by Manning, Maxwell, & Moore, Inc., New York. Industrial applications for Airex Hydraulics products will be developed by Manning, Maxwell & Moore at its Jersey City plant.

▼

▶▶▶ CONSOLIDATION of management has been announced by the Sun Chemical Corporation, New York, for its Fuchs & Lang and Rutherford Machinery divisions. A staff of competent technicians is at the service of those having problems involving lithographic inks, supplies and machinery.

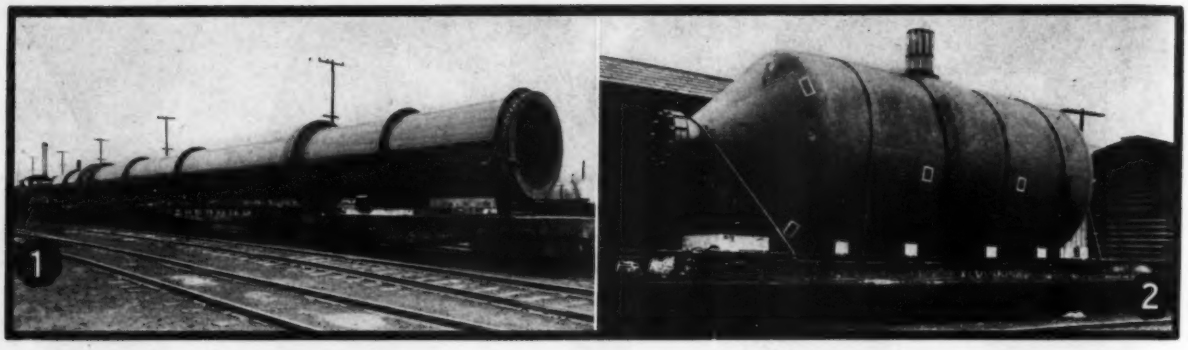

EASTWOOD WIRES
WE BELIEVE
The copy-book phrase "silence is golden" does not apply today. We should not let the enemies of democracy monopolize the public forums. We should speak out for our way of life — and then live up to it.
EASTWOOD-NEALLEY
CORPORATION
AT BELLEVILLE, N.J. SINCE 1877

TENAX FELTS ARE LONG LASTING

SERVING THE PAPER INDUSTRY SINCE 1891

If you have not as yet put Tenax Felts to the test—or our service to the proof—we invite you to afford us that opportunity.

LOCKPORT FELT COMPANY • NEWFANE, NEW YORK



ORDERS . . . SHIPMENTS . . . INSTALLATIONS

Reports Received from Allied Firms Covering New Orders and Installations of Their Products for Pulp and Paper Mills

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—Four flat cars were required and railroad clearances were necessary for shipment in one piece of a 140-ft. A-C rotary lime sludge kiln for a southern sulphate pulp and paper mill. This 181,200-pound kiln has an over-all clearance at its greatest point of 10 ft. 4 in. (Illustration No. 1).

Babcock & Wilcox Co., New York City —The 71,000-pound digester shown in Illustration No. 2 was fabricated at the B&W plant in Barberton, Ohio, recently for shipment to the Camas (Wash.) mill of *Crown Zellerbach Corporation.* The digester is 30 ft. long and holds 4½ to 5 tons of pulp. It is coated inside with a chromium alloy liner 7/64-in. thick. The digester was shipped on this special well-bottom car to accommodate the trunnions on which it is rotated when in operation.

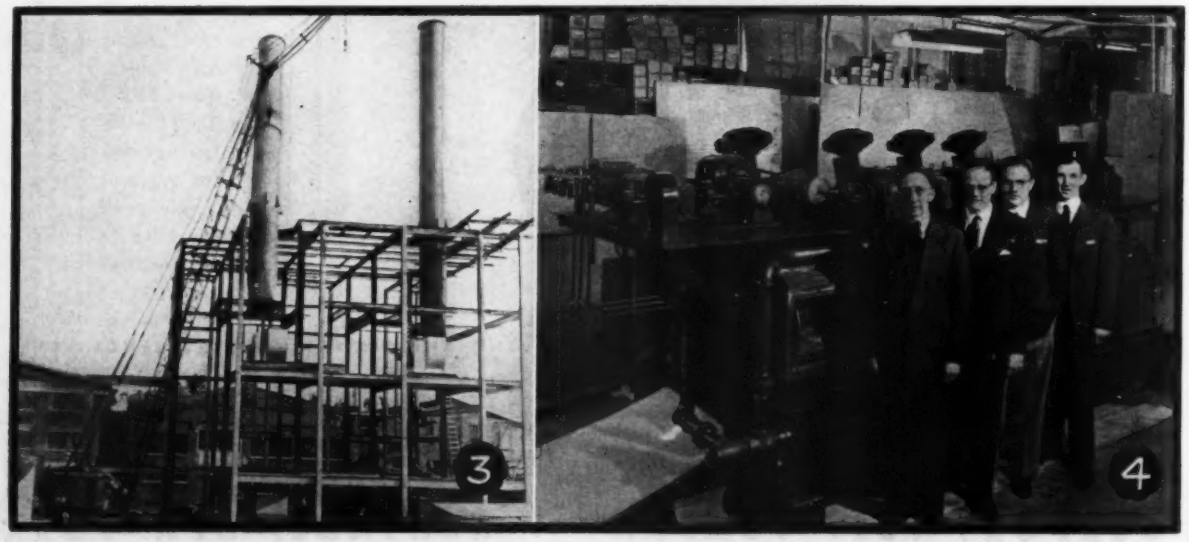
Downingtown Manufacturing Co., Downingtown, Pa.—To add to its 108-in. Downingtown cylinder machine, the *Mutual Box Board Co., Inc.,* Utica, New York, recently ordered two new vat units complete. This machine, purchased in 1906, was a 5-vat machine when purchased. It has been modernized from time to time, and the vat units just ordered will give a total of eight vats. In addition, the company has ordered a new set of rubber-covered primary press rolls complete, 24 additional 42 in. x 102 in. face dryers and new spiral bevel gear drives for the entire machine, which will make 11 Downingtown spiral bevel gear drives in all.

Harnischfeger Corp., Milwaukee, Wis.—At the new power plant of *Hoberg Paper Mills,* Green Bay, Wis., the erection of all structural steel, including steel stacks, was done with the aid of a P&H Model 855B Crawler Crane. For this job, the crane was equipped with a 95-ft. boom and 20-ft. jib for a total of 115 feet (Illustration No. 3).

E. D. Jones & Sons Co., Pittsfield, Mass. —Two new Majestic jordans recently were installed by Jones in the Bucksport, Maine, plant of *St. Regis Paper Co.* These jordans, as well as two formerly installed, are all equipped with stainless steel NOWAVE filling and SKF spherical roller bearings. Lost time for refilling these jordans will be kept at a minimum because the company has purchased a spare plug assembly which is interchangeable in any of the jordans on both machines. This plug is completely filled and equipped with bearings, bearing housings, and packing glands. These always remain on the shaft and greatly facilitate the work of disassembling and assembling the jordan when changing the fillings. . . . The Jones company also has shipped two standard jordans to *Fletcher Paper Co.,* Alpena, Mich.

Lodding Engineering Corp., Worcester, Mass.—Progress in new machine building and modernization among leading paper manufacturers isindica ted by this company's recent installations of Lodding Doctors through the major machine builders to 29 paper and paperboard mills for applications to fourdrinier rolls, dryers, calenders, press rolls, felt rolls, reels, smoothing presses, size presses, creping rolls, and for pick-off operations.

Trimbey Machine Works, Glens Falls, N. Y.—A Metering System manufactured by this company will be installed in the Juan Ortiz mill of *Cellulosa Argentina S.A.* This system will handle bleached sulphite pulp, cereal straw pulp, and bamboo pulp for the new paper machine the company is installing. The two latter pulps are produced in the same mill where the system is to be installed. Shown in Illustration No. 4 with the metering system are E. J. and R. J. Trimbey, with Carlos Ricoi, who will be in charge of the paper mill mentioned, and Juan C. Cremonini, who will be his assistant.



R-S valvEvents

Issued Periodically by R-S Products Corporation, Philadelphia 44, Pa., for Those Concerned with Flow Control and Shut-Off

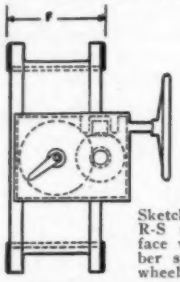
R-S SHOWS NEW VALVE IN NARROW FACE–TO–FACE SIZE

Drawing shows elevation of new R-S Valve for water service in narrow face-to-face size. It is built for 50-pound and 125-pound pressures.

This valve is made for rugged hydraulic service with a large safety factor for line stresses, water-hammer and other normal abuses.

Face-to-face dimensions follow for various available sizes:

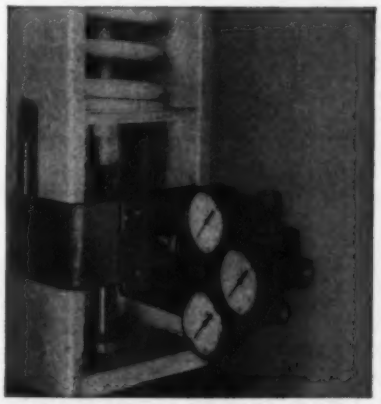
Valve Size	*F*	*Valve Size*	*F*
20″	8″	48″	15″
24″	8″	54″	15″
30″	12″	60″	15″
36″	12″	72″	18″
42″	12″	Larger sizes on request	



Sketch shows new R-S narrow face-to-face valve with rubber spool and hand-wheel control.

The face-to-face dimension includes thickness of the rubber spool with which this valve is normally provided to insure drop-tight shut-off. The valve may be had with metal-to-metal seat if preferred, in which case the face-to-face dimension is ½″ less than the figures quoted above. Because of the narrow face-to-face of this unit it is necessary to drill and tap the 4 bolt-holes on each flange that straddle the center-line of the shaft.

Sketch shows only hand wheel control but the usual hand lever, chain wheel, and chain lever controls are available, too, as well as automatic controls of many types.



Photograph showing control of R-S Valve with Hopkins Cam Positioner

The field of use of the disc type valve, with its lower cost, and capacity of two or three times that of some conventional valves, is thereby greatly widened.

New R-S Valve Representatives . . .

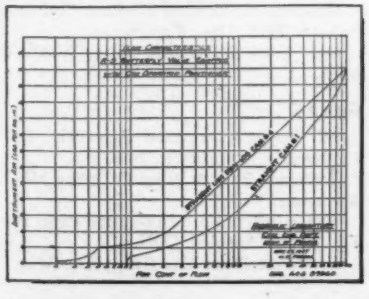
Hardly a month passes without an appointment to the growing list of R-S Valve representation throughout the States and other countries.

This month we announce new representatives in:

El Paso, Texas
Steel & Engineering Products Company
Mills Building, El Paso, Texas
Telephone Main 1770
William W. Small is in charge of this office, covering western Texas.

Toronto, Ontario
Canadian Piping & Refinery Specialties, Ltd.
2498 Yonge Street, Toronto 12, Ontario, Canada
L. T. Brodie is in charge.

Graph shows flow characteristics of R-S Valve utilizing straight Cam #1 and characterized Cam #4. *(See next column)*



R-S Announces New Cam Operated Valve Positioner

A cam-operated positioner is a key feature of a new diaphragm motor valve of the disc or butterfly type just announced by R-S Products Corporation. Excellent control of flow characteristics is attainable by simply changing cams in the field on the cam-operated positioner, which, in effect, adds to the normal functions of the disc type valve. The desirable characteristics of a straight line semi-log curve, linear, or almost any other special characteristics to suit individual process requirements, are within the range of the new positioner.

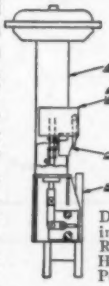


Diagram shows installation of R-S Valve with Hopkins Cam Positioner.

Replacing of one cam on the positioner with another of a different shape permits the retention of the basic advantages of the disc type valve while adding special flow characteristics typical of other valve types. Air motor shown in sketch above utilizes up to 50 p.s.i. operating air pressure. Valve positioner utilizes 0 to 15 p.s.i. instrument air. The cam-operated positioner is also available using hydraulic or air cylinder instead of air diaphragm motor. *(Continued in next column)*

An Off-told Tale!

"Occasionally," says Russell C. Ayers, Sales Manager of the R-S Valve Division, "we note valve and fitting suppliers advertising magnesium and aluminum castings as if they were a discovery."

"The fact is that these metals are not novelties in valve manufacture. R-S has been making valves of magnesium, aluminum, and other light metals, and many alloys for a great many years."

"Further, we make our valves of any material that can be cast or welded, even including plastics for certain purposes."

The New R-S Valve Catalog #17

R-S Valve Catalog #17 is packed with information for engineers. There are over 70 halftone pictures of R-S Valves . . . working drawings of 21 types of R-S Valves with standard controls and fittings and complete dimensional data for all sizes . . . working drawings of 22 types of prime movers . . . numerous other diagrams, graphs and miscellaneous drawings. Address R-S Products Corporation, Valve Division, Philadelphia 44, Pennsylvania.

JMLco P-EE2

GREEN CROSS FOR SAFETY

SAFETY

▶▶▶ A REDUCTION IN the number of child accidents, the leading cause of death among children of more than one year of age, is the objective of an intensive child safety campaign to be launched this fall by the Metropolitan Life Insurance Company with the cooperation of the U.S. Children's Bureau, the American Academy of Pediatrics, and the National Safety Council. Advances in medical science have greatly reduced the percentage of deaths from nonaccident causes, but there has been little improvement in the number of child accidents.

▼

▶▶▶ FOUR DEPARTMENTS of the A. E. Staley Mfg. Company, Decatur, Illinois, have been feted for scoring 1,331,161 man hours without a lost-time accident. The Certificate Award for Safety Record was presented by the American Mutual Liability Insurance Company for the achievements of the Process Department, the Laboratories Division, the Office Janitors Department, and the Tin Shop.

▼

SAFETY SCORES

▶▶▶ THE PAPER INDUSTRY Safety Contest, which began June 30, 1947, is now in its final phase. Fifteen companies remained on the perfect record list when the March scores were tabulated:

Division I—Pulp and Paper Mills

Group A

(None.)

Group B

(None.)

Group C

The Mead Corp. (Sylva Div.), Sylva, N.C.

Armstrong Cork Co., Pensacola, Fla.

Group D

Hollingsworth & Whitney Co. (Abenaquis Mill), Madison, Me.

Container Corp. of America, Carthage, Ind.

Certain-teed Products Corp., Dallas, Tex.

Fort Wayne Corrugated Paper Co., Vincennes, Ind.

Riegel Paper Corp. (Hughesville Plant), Riegelsville, N.J.

Kimberly-Clark Corp., Kapuskasing, Ont., Can.

Container Corp. of America (Western Container), Tacoma, Wash.

Division II—Paper & Board Manufacturing

Group A

(None.)

Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Can.

Old Colony Envelope Co., Westfield, Mass.

Group C

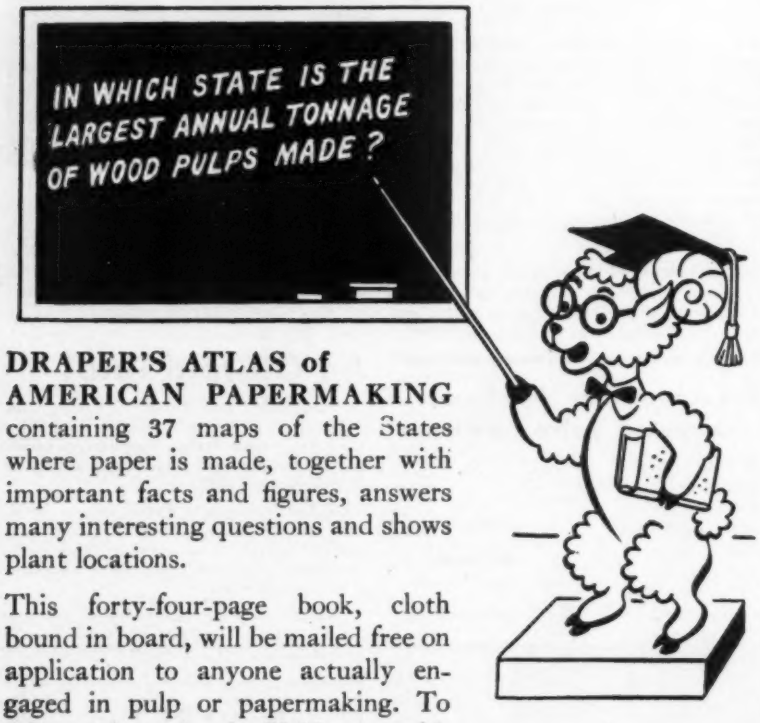
Ft. Wayne Corrugated Paper Co. (Rochester Div.), Rochester, N.Y.

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

The Flintkote Co. (Hollywood Paper Box Div.), Los Angeles, Calif.

Bay West Paper Co., Green Bay, Wis.

What do you know about Paper?



DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, Sales Manager

BRADFORD WEST, Pittsfield, Mass. — WILLIAM N. CONNOR, Jr., Canton, Mass. — L. H. BREYFOGLE, Kalamazoo, Mich.

WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash. — L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 6: The State of Washington

Our service simplifies

your paper work!

When you have paper production problems
remember that STEIN-HALL—
with its years of "know how"—
is eager to be of assistance.

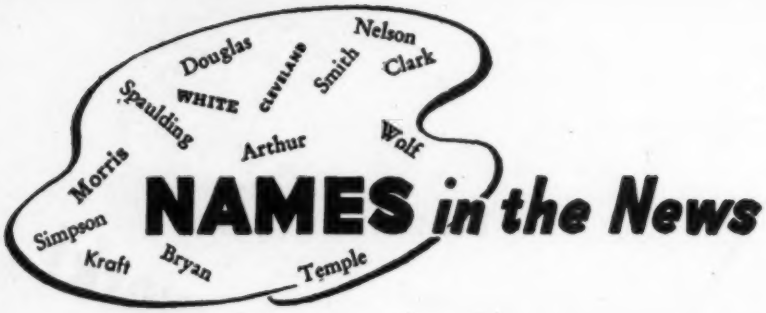
Our salesmen...
more than just selling quality starches,
dextrines and gums...
are technical experts
...versed in applying these products
in actual use.

And those questions which
our salesmen cannot answer...
we will turn over to our fully staffed laboratory,
which is also at your beck and call.

At any time...
your nearest STEIN-HALL man
can be counted on for
prompt, thorough attention.

STARCHES, DEXTRINES AND GUMS
for the Paper Industry
LABORATORY-CONTROLLED FOR QUALITY
AND UNIFORMITY

STEIN HALL



PERSONALS

ADAM LUKE MADE BOARD CHAIRMAN BY WESTVACO-OTHER OFFICIAL CHANGES

Directors of the West Virginia Pulp and Paper Company, New York, elected Adam K. Luke honorary chairman of the board and effected important changes in the active management at a regular meeting on May 20.

Mr. Luke, who has been associated with the company since 1889 and for many years served as treasurer and vice president, has been vice chairman of the board since his retirement as an officer of the company in 1945. His brother, Thomas Luke, was chairman of the board until his death recently. (Cf. P.I. and P.W., May, 1948.)

Sidney M. Phelan, Jr., vice president in charge of sales since 1940, was named first vice president, a newly-created office. Before joining the sales department of the West Virginia company in 1927, Mr. Phelan was vice president of the Republic Paperboard Company, Cincinnati, Ohio, and vice president of the Foster Box Board Company, Utica, New York.

At the same time, the board elected Joseph M. Wafer, general manager of the company's industrial chemical sales division, to the positions of vice president and director, and Lawrence Kavanagh, assistant treasurer, to the position of treasurer. The board also announced that it had accepted the resignation of David Graham, who has served as treasurer since 1945. Mr. Graham is leaving the company to accept an important position in another industry.

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▶▶▶ A member of the utilities division of Scott Paper Company for twelve years, *George H. Hall,* has joined Marinette Paper Company (Marinette, Wis.) as utilities superintendent.

Frank C. Arnold

▶▶▶ A new member of The Moore & White Company, Philadelphia, is *Frank C. Arnold* who will serve as a development engineer covering winders, layboys and cutters. In the past Mr. Arnold was employed at Parker & Young and the Waterfalls Paper Company. He was serving in the finishing division of the Oxford Paper Company when he joined Moore & White.

▼

E. M. MOORE LEAVES UNION POSITION; TO MANAGE TWO PLANTS IN HINSDALE, N.H.

A paper mill union organizer since 1944, Edward M. Moore, has resigned his union position to accept the managership of the Hinsdale Paper Mfg. Company and the White-Washburne Company, both in Hinsdale, New Hampshire.

The companies, which employ about 200 persons, are owned by Isador Baum of New York, who two years ago bought the properties from a corporation of which Floyd Graham, head of the Graham Mfg. Company, was president. The two-machine mill turns out tissue paper for conversion at the White-Washburne plant into toilet tissues, toweling and napkins.

While working out of the Boston regional office of the International Brotherhood of Papermakers, A.F.L., Mr. Moore organized unions at both plants and at other plants in the Ashuelot valley in New Hampshire during 1944, and since then has been representing these unions in contract negotiations.

Mr. Moore was one of five brothers who became papermakers and his father, Michael J. Moore also had been a papermaker. Edward Moore started work in the Gill division of American Writing Paper Corporation in 1929 and was a machine-tender when he left in 1944.

▼

RUFUS EWING LEAVES HOLYOKE CARD—NOW WITH WHITING PAPER

President of the Holyoke Card and Paper Company (Springfield, Mass.) since January, 1943, Rufus D. W. Ewing, has resigned from that position to become a vice president of the Whiting Paper Company (Holyoke, Mass.).

He is being succeeded as president of Holyoke Card and Paper Company by James P. Smith, chairman of the board and treasurer. Mr. Smith is resigning as treasurer, and Robert W. Alderson, former comptroller of the American Tissue Mills, succeeds him in that position. Mr. Ewing had served as manager of the New York office of the American Writing Paper Company from the end of World War I until 1928, and as vice president from 1930 to 1943.

▼

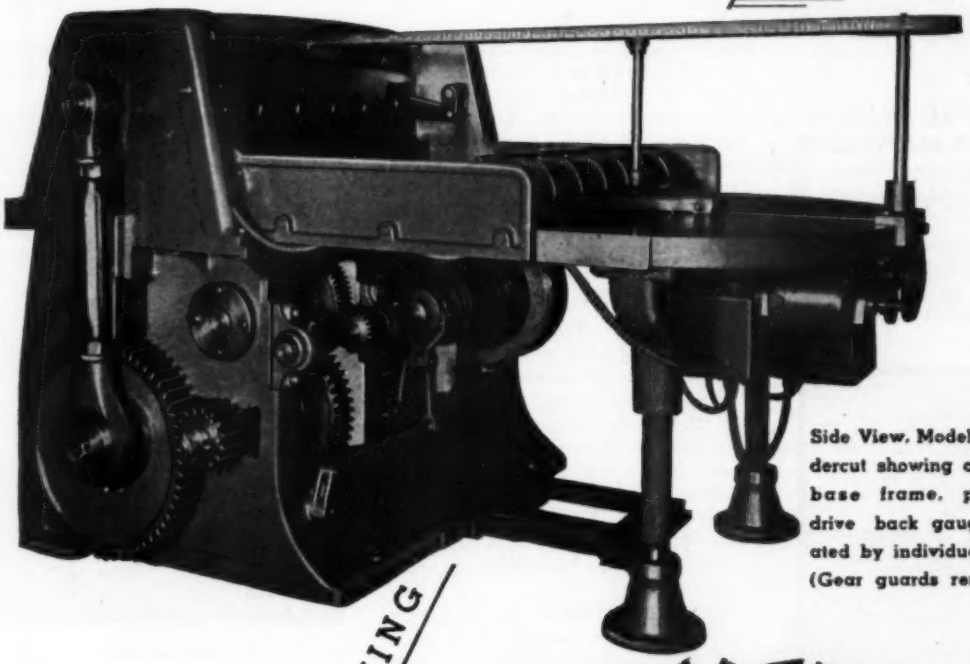
ROBERT PATTISON LEAVES AMER. WRITING PAPER TO HEAD NEW CELLULOSE FIRM

Robert W. Pattison has resigned as superintendent of the Riverside division of the American Writing Paper Corporation to become president of Cellulose Fibres, Inc., a new concern in Holyoke, Massachusetts. Mr. Pattison is succeeded as superintendent of the Riverside mill by Henry J. Coyle.

The new firm which Mr. Pattison heads will produce cotton half stock from cotton waste as its specialty, along with other cellulose products. Production is scheduled to start soon, and about fifty persons will eventually be employed.

A veteran of twenty-five years with American Writing Paper Corporation, Mr. Pattison had entered papermaking at the age of 14 under the late Leon M. Yoerg, then superintendent of the Carew mill in South Hadley Falls and later president of American Writing Paper. Mr. Pattison also worked in the American Writing mill in Windsor

Better than Ever!



Side View, Model "E" Undercut showing one-piece base frame, powerful drive back gauge operated by individual motor (Gear guards removed)

CLEAN ACCURATE TRIMMING

NEW
SMITH & WINCHESTER
MODEL "E" UNDERCUT

The Smith & Winchester Standard Undercut Trimmer is known to the paper industry as an accurate, long-lived, high production machine. The new Model "E" Undercut is designed to include the outstanding features of the Standard plus these new features:

- Heavy, rigid, one-piece base frame
- Anti-friction bearings on drive shaft
- Disc type friction clutch
- Variable speed, reversible motor operates back gauge for close setting of gauge
- Push button control
- Illuminated index tape

Send for bulletin giving full particulars

1828

Makers of
PAPER BAG
and
PAPER MILL
MACHINERY

The SMITH & WINCHESTER
Manufacturing Company
SO. WINDHAM, CONN.

Serving the Paper Industry Since 1828

Locks, Connecticut, and with the National Lead Company in Brooklyn. He returned to Holyoke in 1926, rejoining American Writing Paper as a laboratory worker. An active member of the American Pulp and Paper Mill Superintendents Association, he was named chairman of the Graphic Arts Committee at the recent convention in New Orleans.

▼

DR. MORGAN WILL HEAD RESEARCH AT MATHIESON

Dr. D. P. Morgan has joined the Mathieson Chemical Corporation of New York, formerly The Mathieson Alkali Works, as administrator of research and development. Dr. Morgan will be in charge of market research as well as chemical research and development.

Dr. D. P. Morgan

For the past two years Dr. Morgan has been with W. R. Grace and Company in New York in charge of chemical market research and development. He was a partner in the firm of Loomis, Stump and Banks, consulting chemical engineers, for four years before joining Scudder, Stevens and Clark as chemical consultant. For the last several years of the war he served as director of the Chemicals Bureau of the War Production Board.

▼

A. M. KUEHMSTED TO HEAD DIV. OF SANTA FE T&T CO.

The Santa Fe Tank & Tower Company of Los Angeles has appointed A. M. Kuehmsted to head its expanding cooling tower division as a culmination of twelve years of outstanding service.

During the war, Mr. Kuehmsted distinguished himself as chief engineer in charge of Santa Fe wood tank production for the armed forces. These tanks were used the world over for advanced base water supplies. As chief engineer of the cooling tower division, he will co-ordinate the activities of the branch offices at San Francisco, Houston, Tulsa, and New York.

▼

▶▶▶ *Henry W. Rahn* has been appointed research and development director for Southern Alkali Corporation's Corpus Christi, Texas, plant. Mr. Rahn joined the firm in 1934 as assistant chief chemist, and later served as technical director at the Corpus Christi plant.

▼

LANGSTON CO. ANNOUNCES CHANGE IN PERSONNEL

Samuel M. Langston Company (Camden, N.J.) has announced several personnel changes arising from the retirement of Karl Sieg, chief engineer and chief designer. He had served the company for 28 years.

Mr. Sieg's assistant, William H. Cleaver, is taking over the duties of chief designer. The position of chief engineer will be filled by Charles D. Nitchie, who has been with the company since 1945.

Edward J. Gillespie will be a new staff engineer. In the past he has been with the Champion Paper & Fiber Company at its Canton, North Carolina, mill and also with the Goodrich Rubber Company.

▼

▶▶▶ The appointment of *Blanchard D. Warren* as assistant sales manager has been announced by the Bird Machine Company, South Walpole, Massachusetts. He was with H. K. Ferguson Company before coming to Bird Machine Company twenty-two years ago.

B. D. Warren

HOWARD HUBBARD IS NEW HEAD OF HYDRAULIC PRESS

The diretcors of The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, have appointed Howard M. Hubbard as president, filling a vacancy created by the resignation of H. A. Toulmin, Jr., last November.

Mr. Hubbard has served as president of both the Elliott Company (Jeanette, Pa.) and Greenfield Tap & Die Corporation (Greenfield, Mass.). He has also held the positions of controller, secretary and treasurer and company director of Harris-Seybold-Potter Company, Cleveland. He also served as managing director of its Seybold and Canadian Divisions.

Howard M. Hubbard

For the past three years, Mr. Hubbard has been a consulting and development engineer dealing with new products, manufacturing and export of heavy power equipment.

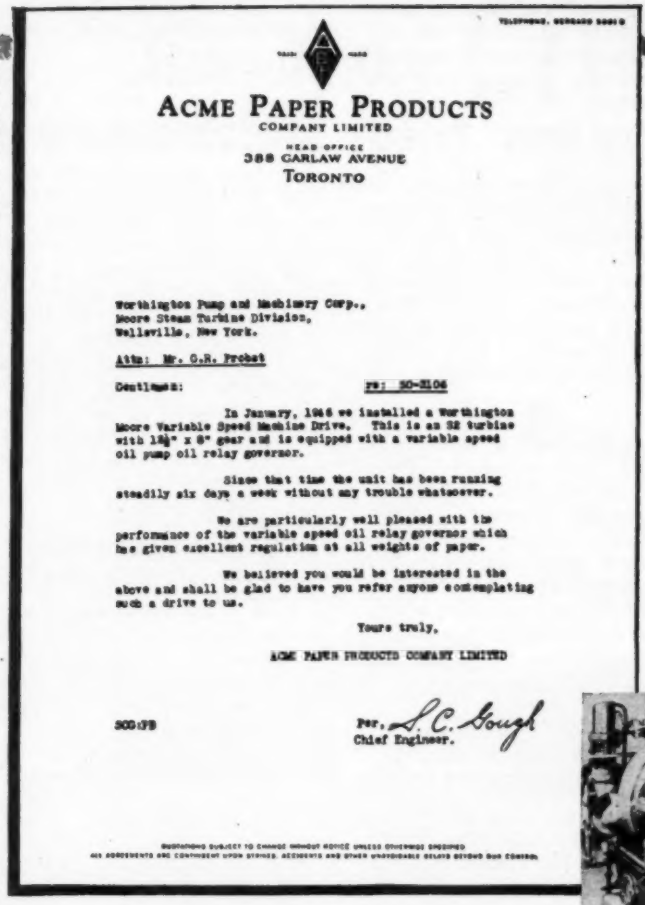
▼

F. S. MACDONALD HEADS NEW CANADIAN SERVICE GROUP

Frank S. MacDonald has been named vice president and general manager of Homad Services Ltd., a new organization which has been granted a Dominion charter to serve the pulp and paper and process industries with stock preparation systems, beating apparatus, new improved Claflin refining, stock storage equipment and mixing equipment.

Mr. MacDonald was recently associated with Sherbrooke Machineries Ltd. and previously with J. R. Booth Ltd.

Homad Service Ltd. is located at 1445 Crescent Street, Montreal. F. J. Hoar is the president of the new company. Mr. Hoar is also associated with G. C. Jenssen Company, Inc., of Watertown, New York.



ACME PAPER PRODUCTS
COMPANY LIMITED
HEAD OFFICE
388 GARLAW AVENUE
TORONTO

Worthington Pump and Machinery Corp.,
Moore Steam Turbine Division,
Wellsville, New York.

Attn: Mr. C.R. Probst

Gentlemen: Re: SO-3106

In January, 1946 we installed a Worthington Moore Variable Speed Machine Drive. This is an 32 turbine with 13½" x 8" gear and is equipped with a variable speed oil pump oil relay governor.

Since that time the unit has been running steadily six days a week without any trouble whatsoever.

We are particularly well pleased with the performance of the variable speed oil relay governor which has given excellent regulation at all weights of paper.

We believed you would be interested in the above and shall be glad to have you refer anyone contemplating such a drive to us.

Yours truly,

ACME PAPER PRODUCTS COMPANY LIMITED

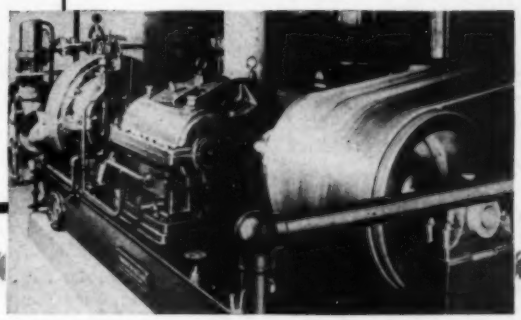
SCO:FB

Per, L. C. Gough
Chief Engineer.

"Running steadily six days a week without trouble"

A prominent Canadian Paper Company sends an enthusiastic report on Worthington Turbine Performance

The Acme installation—a 200 hp Worthington belted paper machine drive unit consisting of turbine, reduction gear with pulley on separate shaft all mounted on baseplate. The turbine normally operates at 4800 rpm, reduced to 700 rpm by the gear and further reduced to 250 rpm by the belted drive. Turbine operates on steam at 175 lbs. pressure and exhausts at 5 to 30 lbs. back pressure.



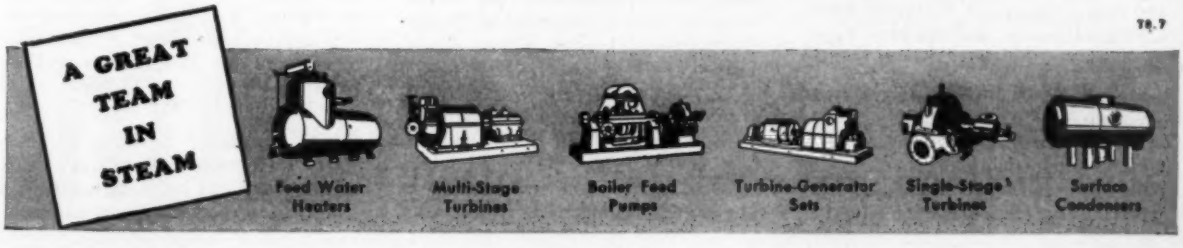
For many paper machine drives, especially on small horsepowers, the type of Worthington unit shown is the most economical and convenient. Your own conditions may call for a different type of unit—direct connected to end of line shaft or direct connected to center of line shaft. Whatever your requirements, Worthington can meet them with a drive that will give you long-lasting, cost-saving efficiency on any size of paper or board machine.

Steady Speed

is one of the many advantages of Worthington Steam Turbines. The variable speed oil relay governor allows speed adjustments over a range of 10 to 1, with no change in operating speed from minimum to maximum load for any given control setting. This reduces paper breakage, permits operation at higher paper speeds, increases stability at all loads.

For further facts proving *there's more worth in Worthington*, contact your nearest Worthington Office. *Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, New York.*

WORTHINGTON



TS.7

DAVID GRAHAM LEAVES WEST VIRGINIA P&P CO. NOW V.P. OF WEYERHAEUSER

At the annual meeting of stockholders held May 30 in Tacoma, Weyerhaeuser Timber Company elected David Graham vice president in charge of finance. Mr. Graham already has taken over his duties with headquarters at the company's general offices in Tacoma.

Mr. Graham recently resigned as treasurer of the West Virginia Pulp and Paper Company. He became associated with that company in 1944; he was made treasurer in 1945. From 1941 to 1944 he was with the War Production Board, principally as chief of the Office of Pulp Allocation.

Prior to 1941, Mr. Graham's positions included important connections with several large companies, both in this country and in England.

▼

▶▶▶ Vice president of Montgomery Ward and Company, *Lawrence A. Appley,* has been appointed president of the American Management Association, and *Alvin E. Dodd,* AMA president for the past twelve years, has been elevated to the newly created post of honorary president. Mr. Appley will leave Montgomery Ward on July 1 to assume direction of AMA activities.

▼

▶▶▶ The resignation of *Paul G. Hoffman* as chairman of the Committee for Economic Development was accepted and his successor announced at a dinner given by the CED trustees in his honor at the Waldorf-Astoria Hotel in New York on May 20. He had been chairman of CED since it was organized in September, 1942.

▼

▶▶▶ The services of *William R. Worboys* as sales engineer for the West coast have been secured by Tri-Clover Machine Company (Kenosha, Wis.). He formerly was sales manager of Trent Tube Manufacturing Company, East Troy, Wisconsin.

▼

▶▶▶ The position of general works manager of Jessop Steel Company (Washington, Pa.) will be filled by *Curtis A. Gordon.* He formerly was superintendent at the Colorado Fuel and Iron Corporation, Wickwire Spencer Steel Division, Buffalo, New York.

▼

▶▶▶ Kimberly-Clark Corporation (Neenah, Wis.) has transferred *Andreas Christensen* to Kapuskasing, Ontario, as production manager of Spruce Falls Power and Paper Company, Ltd., replacing *F. Harold Davis* who becomes staff superintendent of newsprint at Neenah. *D. C. Porter* has been transferred to Terrace Bay, Ontario, as mill manager of LongLac Pulp and Paper Company, Ltd.

▼

▶▶▶ A veteran papermaker, *George Astley,* has retired from his position at the Riverside division of the American Writing Paper Corporation (Holyoke, Mass.). He is 74 years old. Starting his papermaking career at 14, he worked in various mills and joined the Riverside division thirty years ago. His fellow workers presented him with a purse of money on his retirement.

▼

▶▶▶ General manager of St. Regis Paper Company mills at Deferiet, Harrisville, and Norfolk, New York, for the past four years, *Edward F. Marshall,* has resigned, effective July 1. He joined the St. Regis company in 1917 as a machine tender. Mr. Marshall, who is 60 years old, said his plans for the future are indefinite. No successor has been named yet.

▼

DICALITE CO. PROMOTES J. E. MORAN, R. W. BLUNT DURING REORGANIZATION

As one of the final steps in a reorganization plan which began in November, 1947, The Dicalite Company (Division of Great Lakes Carbon Corporation), New York, has announced the appointment of J. E. Moran as general sales manager and R. W. Blunt as

J. E. Moran (left) and R. W. Blunt

market analyst and assistant sales manager with headquarters in the Los Angeles office of the company. This has now been designated as the main office where direction of sales and advertising, as well as production of Dicalite diatomaceous filteraids, fillers, insulation, etc., will be centered.

Mr. Moran is a graduate in chemistry of Massachusetts Institute of Technology and joined The Dicalite Company in 1935. He served in the Navy during the war and returned to The Dicalite Company as export manager. He will continue in this capacity in addition to being general sales manager.

Mr. Blunt graduated from Wittenberg college with degrees of B.S. and A.B. after majoring in chemistry, and was connected with the college for the next four years in vocational guidance work. During the war he was engaged in highly confidential work as consultant in organizing war production plants. Upon completion of this work he was with Ohio Boxboard Company for approximately two years, leaving to join Dicalite in April, 1945. He resigned in 1947 to take charge of development and promotion of the calcium carbonate division of Annville Stone Company, Philadelphia, and then rejoined Dicalite this April to accept his new position.

▼

TWO ENGINEERS RETIRE FROM LEEDS & NORTHRUP

Felix Wunsch, veteran engineer and inventor, and Shop Engineer Paul V. Roth have retired from Leeds & Northrup Company, Philadelphia. Both men were honored at dinners by groups of their associates.

Mr. Wunsch, inventor of numerous circuits widely used in electrical measuring instruments, had completed nearly 43 years as a member of the engineering staff. He has had patents issued on twelve designs which proved valuable to the industry. A thirteenth patent is now applied for.

Mr. Roth completed nearly 46 years of service. The company was only three years old when he joined it in 1902, as head of one of the shop divisions.

▼

▶▶▶ The appointment of *Paul R. Oliver* as West coast manager has been announced by the Farrel-Birmingham Company, Inc. (Buffalo, N.Y.). He has worked as service engineer for the company since 1942, and before that was employed by the American Can Company and the Ankerite Paint Company in electrical engineering capacities. Prior to this he worked for twenty-two years for the B. F. Goodrich Company.

▼

▶▶▶ A seventh term as president of the Allis-Chalmers Manufacturing Company, Milwaukee, has been voted to *Walter Geist.* All directors and officers also were re-elected at the annual meeting of the stockholders and directors.

▼

▶▶▶ A dinner honoring *William Recht* was given at the Hotel Pennsylvania April 21 by the Sun Chemical Corporation, New York, in commem-

Here is the CMH answer to expansion joint maintenance problems

CMH Controlled-Flexing Expansion Joints
Sizes 4" to 24" Inside Diameters. For Pressures up to 300 p.s.i. Temperatures to 900° F. Copper or Stainless Steel Pressure Carriers. Traverse from 5/16" to 6-3/4". Flanged or Welding ends. Control Rings Corrugation-mated to close working tolerances.

CMH Free-Flexing Expansion Joints
Sizes 4" to 24" Inside Diameters. For Pressures up to 30 p.s.i. Temperatures to 900°F. Copper or Stainless Steel Pressure Carriers. Flanged or Welding Ends.

Once a CMH Expansion Joint is installed you can forget about it. *There are no maintenance problems . . . there is no maintenance expense.* CMH Expansion Joints are FLEXONICALLY* engineered to give years of dependable service in the control of expansion and the correction of piping misalignment. They are compact units requiring a minimum of space.

CMH Engineered Applications take the guesswork out of expansion joint selection . . . your best assurance of getting the right expansion joint for the job. Write today, for complete details and ask for a copy of Expansion Joint Bulletin EJ-47.

"FLEXON" identifies CMH products, which have served industry for more than 45 years.

*the science of FLEXONICS . . . "the controlled bending of thin metals for use under varying conditions of temperature, pressure, vibration and corrosion" . . . is exemplified in the basic products of Chicago Metal Hose Corporation.

CMH EXPANSION JOINTS

CHICAGO METAL HOSE CORPORATION
Expansion Joint Division • Maywood, Illinois
Plants at Maywood, Elgin and Rock Falls, Illinois

oration of the thirty-fifth anniversary of his association with the organization. Mr. Recht is vice president of Sun and chairman of its Graphic Arts Group.

▼

EARL O. SHREVE RETIRES AS G-E VICE PRESIDENT

Earl O. Shreve, vice president of the General Electric Company on the president's staff and president of the U.S. Chamber of Commerce, has retired from the company after forty-four years of service, it has been announced by Charles E. Wilson, G-E president.

In 1904, just after graduation from Iowa State College, he joined General Electric as a student engineer on the Test Course at Schenectady. He was awarded the Marston Medal in June, 1938, by Iowa State College for outstanding achievement in engineering by its alumni. In 1940 he was elected president of the National Electrical Manufacturers Association, and served in that capacity for one year.

▼

▶▶▶ Former chief chemist of the Paisley Chicago Laboratories, *Sam Schuller,* has been appointed technical director of the combined operations of Paisley Products, Inc. His appointment gives him direction over all eastern laboratories, which will be fully staffed and integrated with the Chicago Research and Development Department.

▼

▶▶▶ New sales representative in Los Angeles and Southern California for Harris-Seybold Company of Cleveland is *Ormel F. Duke.* Mr. Duke has been active in the graphic arts industry for the past fifteen years, having had experience as a pressman, instructor, serviceman, cameraman, and platemaker.

▼

▶▶▶ Industrial district manager for the Scott Paper Company (Buffalo, N.Y.), *Fred W. Witt,* has been appointed assistant advertising manager in charge of industrial advertising at the company's headquarters in Chester, Pennsylvania. Mr. Witt has represented the company in Buffalo since 1946.

▼

▶▶▶ Management additions of the Hammermill Paper Company (Erie, Pa.) include that of *Mortimer E. Graham,* prominent Erie lawyer and former district attorney, as company secretary. Also elected were *Bertram E. Claridge,* former secretary, as vice president, and *John H. Devitt,* controller, as assistant treasurer. *Richard P. Price,* vice president and general superintendent, was appointed to serve on the Hammermill executive committee.

▶▶▶ Former manager of the Pennsylvania mills of the Glassine Paper Company, *C. M. Connor,* has joined the Ohio Boxboard Company, Rittman, Ohio, in the capacity of manager of the Research and Development Department. He will fill the position previously held by J. C. Morris, who is assuming a new position in the Production Division.

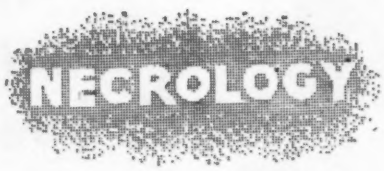
▼

▶▶▶ The Pulp and paper mills in the South will be covered for Oliver United Filters Inc., New York, by *Vernon C. Hill.* The new member of the sales staff is a graduate of Alabama Polytechnic Institute.

▶▶▶ President of the Holyoke Machine Company (Holyoke, Mass.), *Paul Bidwell,* has resigned. He has been connected with the company for the past two years; formerly he was general manager of the American Tissue Mills.

▼

▶▶▶ Vice president of the St. Regis Sales Corporation of New York, *Ambrose T. Plunkett,* has retired effective July 1. He was associated with St. Regis, and its subsidiary, the Taggart Corporation, for the past thirty-three years. A luncheon was given in his honor by Roy K. Ferguson, St. Regis president.



EDWIN HARRIS WHITING

Edwin Harris Whiting, special purchasing agent for paper in the government printing office since the beginning of World War II, passed away May 4 at Arlington (Va.). He was 65 years old.

Mr. Whiting was first employed by the Whiting and Patterson Paper Company of Philadelphia and later joined the sales staff of International Paper Company. He also was associated with the Mead Sales Company before taking up his government position.

He is survived by his widow.

▼

FRANK P. WILDER

A prominent paper mill executive, Frank P. Wilder, passed away May 9 in his Portland, Oregon, home at the age of 74.

Mr. Wilder assisted in the formation of the Carthage Sulphite Pulp Company (Carthage, N.Y.) in 1898, and later served as secretary and treasurer. He also was a director of the Champion Paper Company and the West End Paper Company. For a time he was secretary-treasurer and general manager of the Diana Paper Company, and in 1928 he left for the West coast to serve as sales manager for the H. Waterbury and Son Company.

▼

PERCY H. TIGWELL

Percy H. Tigwell, sales engineer for the Beloit Iron Works and an employee of this firm for the past 32 years, passed away at his home in Beloit, Wisconsin, on May 18, at the age of 55.

Starting his employment with the Beloit Iron Works in 1916, Mr. Tigwell "worked his way" through the various departments to the post of sales engineer, becoming widely known in the paper industry. He was a member of the Technical Association of the Pulp and Paper Industry, the American Pulp and Paper Mill Superintendents Association and served the American Society of Mechanical Engineers for many years in various capacities.

He had a host of friends throughout the country and his loss will be felt by both his associates and his many friends in the industry. He had those qualities in him which inspired confidence and he enjoyed the respect of all with whom he came in contact.

▼

WILLIAM E. PERRY

President of the Plymouth Paper Company (Holyoke, Mass.), William E. Perry, passed away at his Springfield home on June 1 at the age of 69.

Mr. Perry joined the Franklin Paper Company in Holyoke shortly after leaving school, remaining with that mill for ten years before joining the Crocker-McElwain Company. He opened a branch office in Chicago for Cocker-McElwain and served for four years in that city. Later he became sales manager of the Chemical Paper Company, serving in Holyoke and New York. He bought the Plymouth Paper Company in 1929.

He is survived by two daughters.

▼

FREDERIC WILSON MAIN

Formerly an officer of the Salesmen's Association of the paper industry, Frederic Wilson Main, passed away at his home in Springfield, Massachusetts, on May 31. He was 76 years old.

After serving on the *Springfield Daily Republican* for many years, Mr. Main joined the Worthy Paper Company as a salesman in 1912. He was

for five years a member of the executive board of the Boston Paper Trade Association, serving as its president for two years. He also had served as a regional vice president of the American Institute of Graphic Arts. Since his retirement in 1942 he continued to serve as a director of the Hurlbut Paper Company (South Lee, Mass.).

▼

▶▶▶ Master mechanic at the Whiting Paper Company (Holyoke, Mass.) for many years, *Gideon T. Miles, Sr.*, passed away suddenly May 14 while at work at the Whiting mills. He was 71 years of age. Surviving him are his widow, one son, and two daughters.

▼

ROGER WM. McCORKINDALE

Superintendent of the Parsons Paper Company (Holyoke, Mass.) and for thirty years connected with the paper industry in Holyoke, Roger William McCorkindale, passed away May 15 at the age of 64.

In 1903 Mr. McCorkindale entered the Parsons Paper Company where his father was superintendent, and learned papermaking from the rag - room through the various departments. After eight years he became assistant superintendent and in 1923, on the death of his father, was appointed superintendent. He formerly was a director of the Millers Falls Paper Company.

His widow and a daughter survive.

▼

▶▶▶ Eastern sales manager of the Dow Chemical Company (Midland, Mich.), *Ralph E. Dorland*, passed away May 14 in New York at the age of 68. He was president of the Synthetic Organic Chemical Manufacturers Association and past president of the Salesmen's Association of the American Chemical Industry.

▼

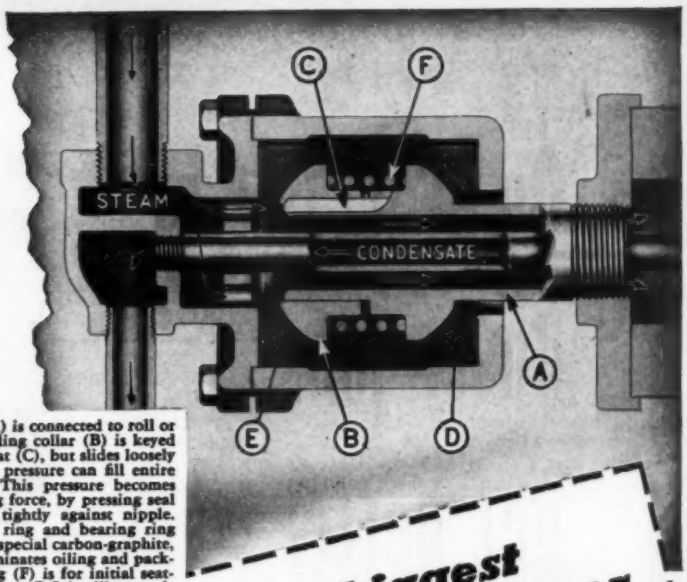
CHARLES FISCHER

A beloved and internationally known musician, Charles Fischer, of Kalamazoo, Michigan, passed away on May 17. He was 69 years of age.

In 1947, Mr. Fischer celebrated his golden anniversary as an orchestra leader. He founded the orchestra known as Fischer's Globe Trotters which had played around the world several times.

Since the Michigan Division of the Superintendents Association established its annual Ladies Night Dinner, Mr. Fischer and his orchestra entertained during the dinner and played for dancing afterwards. Their sparkling rendition of the best in music will be missed by all who have had the pleasure of hearing them.

Mr. Fischer is survived by his widow.



Nipple (A) is connected to roll or drum. Sliding collar (B) is keyed to nipple at (C), but slides loosely over it so pressure can fill entire housing. This pressure becomes the sealing force, by pressing seal ring (D) tightly against nipple. Both seal ring and bearing ring (E) are of special carbon-graphite, which eliminates oiling and packing. Spring (F) is for initial seating only. Type B Joint illustrated; other types, sizes for all needs.

...it's the biggest little trouble-saver in the mill...

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a businesslike way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment—with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

Write for literature and the name of your nearby Johnson representative.

JOHNSON Rotary Pressure JOINTS

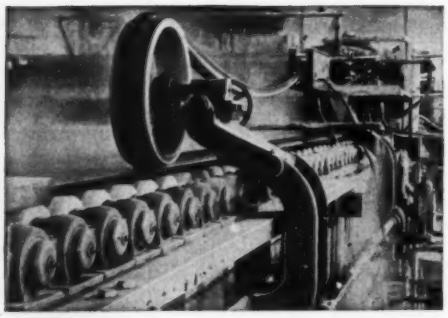
THE JOHNSON CORPORATION
845 WOOD STREET
THREE RIVERS, MICHIGAN

On wet, hot or dusty jobs... get better lubrication with

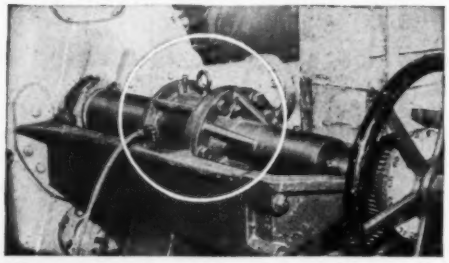
SUPERLA GREASES

Superla Greases are available in two types and a wide range of grades. You will therefore find them the answer to better lubrication of anti-friction bearings under many operating conditions.

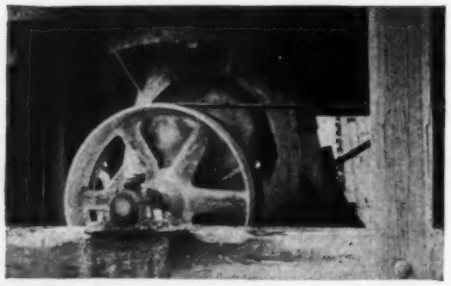
Just a few examples are briefly described here. The booklet gives more details of the properties and qualities of Superla Greases. It may help you save maintenance and money by showing you how to reduce bearing failures. Write Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago (80), Illinois, for a free copy of the booklet.



WET Wet-end roll bearings on paper mills are particularly difficult to lubricate because they are subjected to a constant shower of water. They require a high grade moisture-resistant lubricant such as Superla Numbered Greases, which are lubricating many installations of this type.



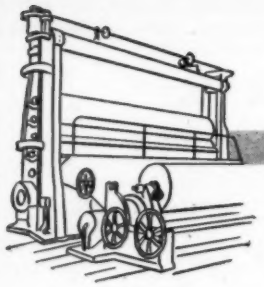
HOT In Jordan bearings, pressures are high and excessive temperatures frequently occur. The high grade Stern Stafford anti-friction bearings pictured above have been successfully lubricated for a number of years with high temperature Superla X Grease.



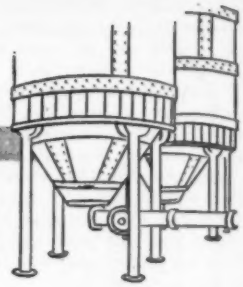
DUSTY Because all bearings can't be operated in air-conditioned surroundings, some, like the crusher bearings pictured above, need the all-weather protection of Superla Grease. Before Superla was used, these bearings twice needed replacing because of summer overheating, which allowed the grease to leak out and dust to get in. With Superla Grease, no bearings have failed, summer or winter.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Methods of Curing Concrete

Practically all concrete as mixed contains an excess of water over that required for hydration. The problem of curing, therefore, is essentially to prevent the evaporation of this water. In some cases the surface of the concrete is sealed with a compound applied immediately after it has set. This is effective where sealing of the surface without penetration is accomplished. Wet burlap, canvas, or straw coverings are often used with good results. The covering should be placed as soon as it can be done without marring the surface of the concrete and care should be taken to keep the covering continuously wet by frequent sprinkling. Since fresh concrete will not take up additional water, the concrete may be wetted down immediately after finishing, taking care to prevent surface cement from being washed out. Floor finishes and all two-course work should receive careful attention as moisture is not only lost by evaporation but also some of the water from the finish layer is drawn out by the base course. Ponding is a good method of curing for flat horizontal surfaces, such as floors and pavements. With this method the surface to be cured is surrounding with small earthen dikes and then kept flooded with water for the desired period. Vertical surfaces are most difficult to cure, but the effort is well worth while. They may be protected by leaving the forms in place as long as possible, or by hanging canvas or burlap over the surface and sprinkling. Exposed surfaces should be protected from drying out for at least 7 days, and for a longer period when practicable. *Design and Control of Concrete Mixtures (8th edition)*, PORTLAND CEMENT ASSOCIATION.

▼

Corrugated Board Over Floor Racks Protects Fiber Boxes in Transit

Because of the freight car shortage which forces a shipper to use whatever type of car is available, it is frequently necessary that corrugated fiberboard boxes be loaded in refrigerator cars equipped with floor racks. When this occurs, the shipper should see to it that the racks are covered with sheets of corrugated board or flattened boxes. If this is not done, the cartons will not only be dented and creased by the open racks, but are very apt to wedge in the spaces between slats and cause considerable damage when the load shifts during transit.

Failure to cover floor racks when shipping fiber boxes in refrigerator cars is an important factor contributing to the high rate of damage occurring to packaged freight moving by rail. The accompanying illustrations show actual conditions found in some of the freight cars which have been inspected as a part of a nation-wide survey of shipping practices during which the life-cycle of over 860,000 fiber shipping containers has thus far been studied.—THE SHIPPING CONTAINER INSTITUTE.

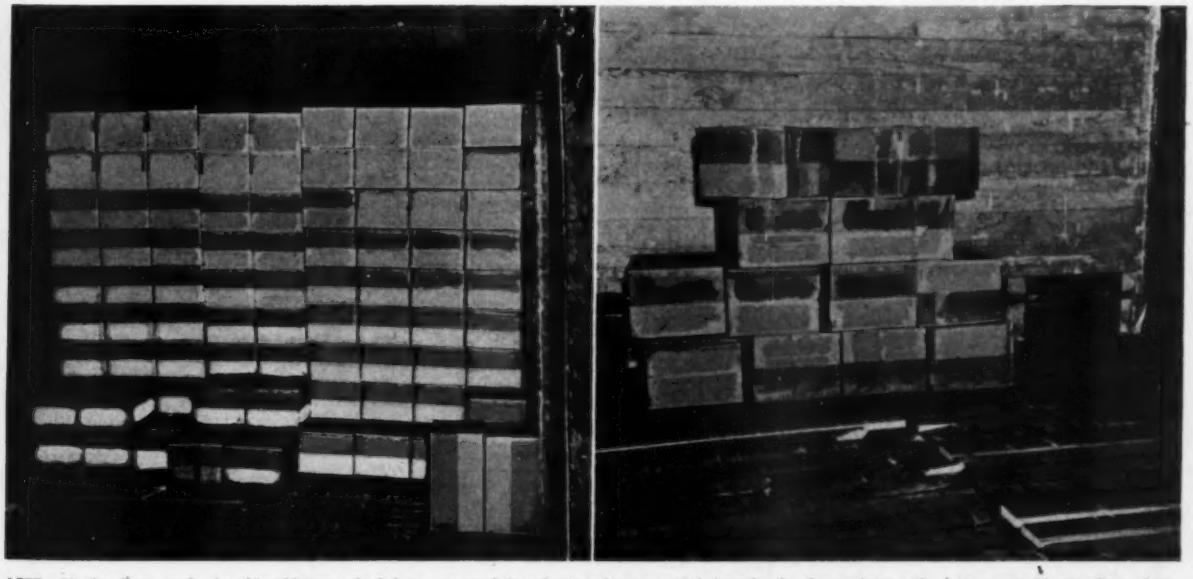
▼

Do You Follow Directions?

Most manufacturers of today are very careful about sending complete instructions with their products in order that there will be no failure in operation and in order that the product itself will not be ruined because of unintelligent application.

The writer knows of an instance where the manufacturer always writes a personal letter to the executive in charge of installation in addition to printed instructions that accompany the product. Yet, in spite of these precautions he finds his product installed in the wrong way time and again.

One buyer actually felt insulted by this manufacturer because of the sending of detailed instructions. He was very cold to the salesman when the salesman appeared on the premises again and remarked rather loftily, "Don't you suppose I know how to do the simple little jobs around this plant after twenty years experience without being told in schoolboy fashion?" The salesman apologized, of course, but he explained that the



LEFT—If the floor racks in this shipment had been covered by sheets of corrugated board, the lower layer of cartons would not have been damaged. . . . RIGHT—Each of these cartons shows the indentation of floor racks. Further cause of damage are the broken gaps in the floor racks

same thing is done in every case and for reasons that he made clear to the buyer. So in a short time the buyer warmed up and didn't feel so badly about it. Later on it was the buyer's turn to apologize when the salesman discovered that the product had been installed "backwards," in error. It so happened that it would operate either way, much like an ordinary globe valve, but there was a right way and a wrong way.

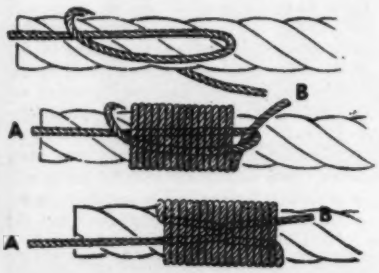
A bad habit possessed by many buyers is to unpack a thing hurriedly and throw the instructions away with the packing. We comment to ourselves, "That's just advertising stuff and I know all about it already." Thus in one instance many years ago a friend received a machine that arrived knocked down. The machined and finished parts were covered by a blue lacquer, and he couldn't get the lacquer off. He tried scraping, washing with hot water and soap, gasoline, kerosene, and everything he had on hand, but the lacquer wouldn't come off. So he telegraphed the manufacturer and received a short and snappy reply which said, "The instruction book tells you to use alcohol." He had thrown the instruction book away. Alcohol removed the lacquer with ease.

Things are done differently right along. They are done *better* this year than last. Next year they will be done better than this year. And so on without end. It therefore behooves us to be careful about throwing printed matter of this kind away. Always scan it with care, at least, even though you don't read every word. Be sure that you are acquainted with the "latest and best" method of applying the part or product, no matter how simple it may seem. Thousands of dollars worth of equipment is ruined every day because of misapplication. The reason for the misapplication is usually the know-it-all spirit in which too many buyers receive shipments and install them. Tomorrow, very likely, some of us will turn around and carelessly throw away directions in the same old way without thinking. It is done mechanically. It is a habit. It is a bad habit.—W. F. SCHAPHORST, M.E.

Keep Rope Ends From Unraveling

A good rope deserves good care. One way to keep your rope in good condition is to "whip" or bind the ends to prevent unraveling.

To make the whipping, a fine yarn, marline or spunyarn is generally used. The ordinary whipping is made by placing the end of the yarn at the end of the rope and then



laying a loop along the rope. You then wind the yarn tightly around both loop and rope, thus binding them together. Wind to a distance roughly equal to the diameter of the rope you are whipping.

The whipping is finished by putting the winding end B through the loop—then pulling end A tight, until the loop is drawn back out of sight. Both ends are then cut short to make a neat finish.—*Useful Knots and How to Tie Them*, PLYMOUTH CORDAGE COMPANY.

▼

When Using a File

1. Be sure the material to be filed is held securely. Loose work permits the file to chatter, which dulls the teeth.

2. In placing the handle on the tang of the file, do not hit the end of the file to drive it into the handle. Push the handle on, and holding the point of the file up, tap the butt end of the handle on the bench to drive the tang into place.

3. Do not exert too much pressure but keep the file cutting-do not allow it to slip over work, as this dulls the teeth.

4. Be sure to raise the file slightly during the return stroke in order to clear the work and prevent dulling by wearing away the back of the teeth, thus destroying the cutting edges. This does not hold true in the filing of soft metals, such as lead, aluminum, etc. The correct procedure in this case is to draw the file back along the metal on the return stroke as an aid in cleaning the teeth.

5. If the file is not cutting and you find that the spaces between the teeth are choked, you should use a file card and brush. Never tap the file to clear its gullets of clogged material. This may break the teeth.

6. On completing your work, do not throw the file on the bench. Lay it down with all the respect due a quality tool. Remember that to do their work effectively files must be made as hard as fire and water can make them. Consequently, the teeth are easily chipped and dulled by rough handling.— *Disston Saw, Tool and File Manual*, HENRY DISSTON & SONS, INC.

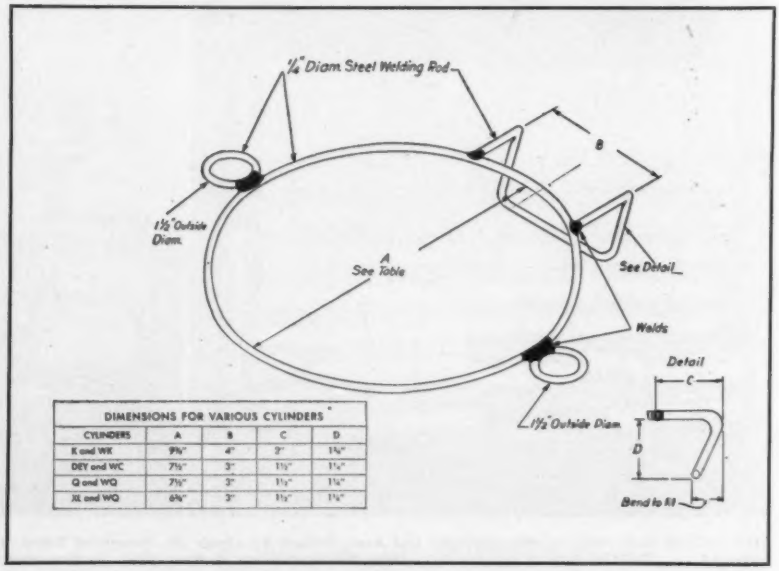
▼

Keep 'Em Standing

With this easily-made cylinder clamp you can make this cylinder clamp from steel welding rod for about 15 cents—and it may save you several dollars damage to your regulator, or a personal injury. All you do is heat and shape the rod around a length

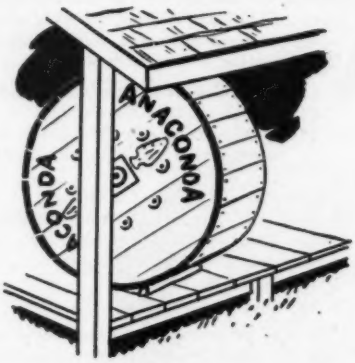
Chain one of the eyes to a pipe or other support and the cylinders will stay upright

of pipe and weld it as the sketch shows. The large ring fits around the oxygen cylinder and the hook clamps over the acetylene cylinder. When you chain or wire one of the small eyes to a pipe or pillar, you have a sturdy anchor for your cylinders. This clamp will fit the "K" type oxygen cylinders and the "WK" type acetylene cylinders. You can alter the dimensions and make clamps for smaller cylinders too.—*Linde Tips*, THE LINDE AIR PRODUCTS COMPANY.



DIMENSIONS FOR VARIOUS CYLINDERS				
CYLINDERS	A	B	C	D
K and WK	9⅛"	4"	2"	1¼"
DEY and WC	7½"	3"	1½"	1¼"
Q and WQ	7½"	3"	1½"	1¼"
XL and WQ	6⅝"	3"	1½"	1¼"

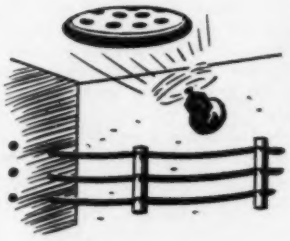
To Keep Electrical Wiring in Condition



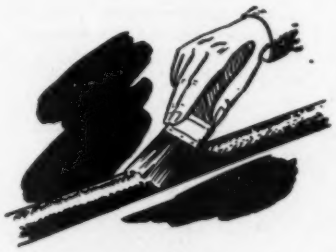
DO be careful to protect wire and cable in storage. Always store in a cool, dry place. Keep reels off the ground, to prevent rotting of reel and lagging. This makes handling easier, and protects wire and cable from moisture, rot or mold.

DO provide protection for outside wires and cables. Wherever possible, run wires and cables along the undersurface of overhead structures, for protection against rain, sleet, snow and sun.

DO place riser cables on the north side of the pole to shield them from direct sun rays. Also place shield guards around cables on poles, from the ground to 10 feet above, for mechanical protection.

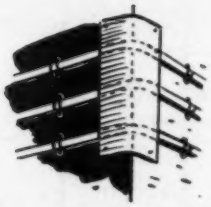


DO keep manholes well ventilated. In most cases, an ordinary office type electric fan will serve the purpose adequately.

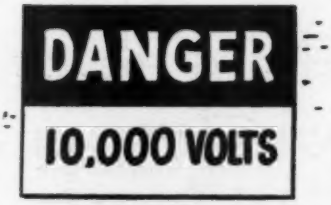


DO protect the sheathing of outside cables against deterioration by applying weatherproof coating every year or two.

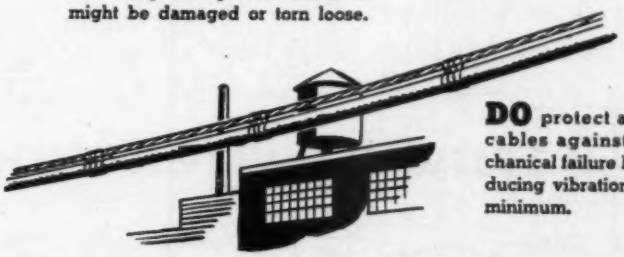
DO check duct installations frequently for moisture. Keep dry—pump if necessary, especially after heavy rains.



DO protect wire on corners or other exposed places where it might be damaged or torn loose.



DO provide adequate warning signs and protective features around cables or wires carrying high voltages.



DO protect aerial cables against mechanical failure by reducing vibration to a minimum.

Adapted from material of Anaconda Wire and Cable Company.

Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the annual meeting of the **American Pulp and Paper Mill Superintendents Association** held in New Orleans, Louisiana, May 19-21, 1948.

Protection of Electrical Power Circuits and Associated Apparatus in Paper Mills

W. M. EMMONS
Switchgear Div.
Westinghouse Electric Corporation.

For the protection of electrical power circuits in paper mills, it is desirable to consider the apparatus associated with the circuits and the equipment employed to provide the protection. This paper is an attempt to describe the various electrical circuits and apparatus involved in a typical paper mill, with emphasis on the protection essential to properly operate such apparatus and circuits.

A typical paper mill is selected as one in which the power is generated, usually at 2400 volts and is distributed to load centers for supplying the larger motors direct at this voltage. The smaller motors are usually supplied at 440 volts from this same distribution system with a power center or unit sub-station type stepdown transformer. Many mills of this type are located in the Southeast. In the newer mills where it is possible to start from "scratch" without any relation to an exisiting installation (or other mills) a higher generator voltage such as 4160 volts is used with larger motors of same voltage. In other cases, it has been found desirable to generate and distribute power at even higher voltages such as 12 Kv or 13.8 Kv and stepdown at load centers to the selected voltage for both the larger and smaller motors. If very large motors such as grinder motors are involved they may be of the same voltage as the generators. There are several factors that dictate the choice of the generating, primary distribution, and motor voltages. No attempt will be made in this discussion to cover this subject in detail; however, it might be well to merely mention what some of the factors are: (1) size of generating units and plant (2) size of motors (3) size and cost of circuit breakers with carrying capacity and interrupting capacity available for commercial application (4) size, length, and cost of cable for primary and secondary distribution (5) number and size of stepdown transformers (6) interchangeability with existing equipment (7) voltage drop and regulation, and (8) cost and complications of a synchronizing bus and reactors if required. Economy and interchangeability determine to a large extent the final selection of voltages.

Not because it is necessarily recommended, but because it is prevalent in paper mills in the Southeast, an installation involving generation and primary distribution at 2400 volts with a synchronizing bus and reactors, larger motors 2300 volts, and smaller motors 440 volts has been selected as the example for this paper. The single line diagram of this system is shown in Figure 1. Another reason for this choice is because of the heavy capacity circuits and equipment with their related problems, not all of which are encountered on higher voltage systems. The following will be dealt with:

(1) Generators and Generator Circuits
(2) Main Generator Bus Sections
(3) Synchronizing Bus Tie Circuits, Synchronizing Bus and Current Limiting Reactors
(4) Primary Feeder Circuits
(5) 2300 Volt Motor Circuits and Motors
(6) Stepdown Transformers
(7) 440 Volt Feeder Circuits
(8) 440 Volt Motors
(9) System Grounding

The type of protective relay or device and the associated breaker or arc interrupting device commonly employed to provide protection and disconnect the circuit or apparatus in trouble from the system will also be described.

(1) Generator Circuits and Generators

Since in the system in question the generators are the source of electrical power to operate the mill it is vitally important and essential that they be fully protected and kept on the line as long as possible. A generator and its cable or bus circuit are subject to abnormal conditions such as internal faults, overloads, and high temperatures. The latter two can be observed and controlled manually by the station operators, but it is

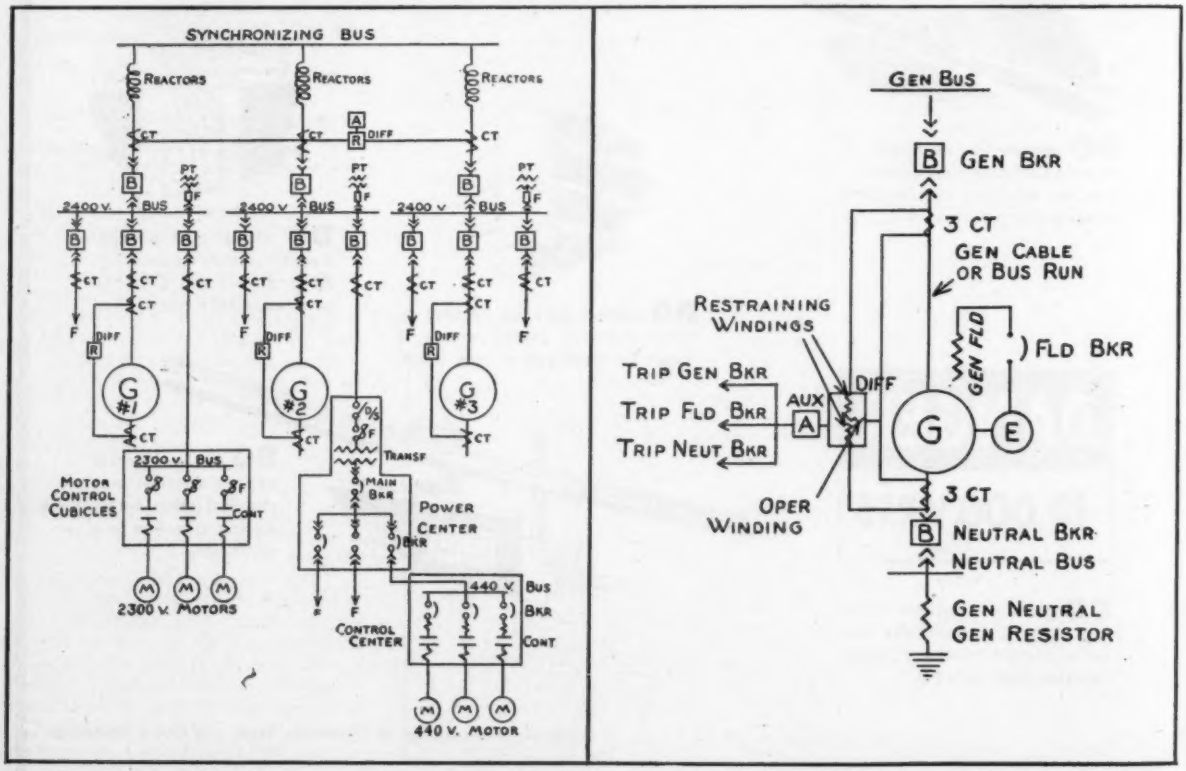


Fig. 1 (left)—Single-line diagram of typical paper mill electrical distribution system. . . . Fig. 2 (right)—Generator differential protection

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common practice to provide protective relays for internal faults, which will operate quickly to disconnect the faulted equipment from the system, thus minimizing the damage to the faulted apparatus and also preventing severe shock to the system.

Overload relays of the induction type are used on the larger generators to provide back-up overload and bus fault protection. They should have long time delay characteristics to prevent operation on momentary peak loads and during synchronizing.

A differential scheme for generator protection is the accepted standard. Briefly this scheme is based on the principle of balancing the secondary currents in current transformers in the outgoing and neutral circuits of the generator so that under normal conditions, the current will circulate in the transformer secondaries, and none will pass through the relay. Any difference in current represented by an internal fault in the generator such as turn to turn breakdown in the windings, phase to ground, or phase to phase faults, will flow in the relay, and when it reaches a value corresponding to the setting of the relay it will function to trip the necessary breakers and other devices to disconnect the generator from the bus and if necessary shut it down. This form of protection is sensitive, fast and inherently selective. A percentage-differential relay provides this protection. In addition to the operating windings it has restraining windings which cause the tripping current magnitude to increase in proportion to the current instead of remaining constant under all conditions. This means extreme sensitivity and prevents tripping on external faults.

It is desirable to include the generator cables or bus run in the differential zone. This can be done by locating one set of current transformers at the end of the generator circuit (usually in the generator switchgear). In this way a fault in the generator or the generator circuit will be detected and cleared by the differential relay.

The differential relays are connected to a multi-contact auxiliary relay to trip the main generator breaker, the field breaker, and the generator neutral breaker (if used) and in some cases trip the governor solenoid on the turbine to completely shut down the unit. A typical generator differentiail scheme is shown in Figure 2.

In generators larger than 7500 Kv.-a. at 2400 volts, the full load current will exceed 2000 amperes and it may be desirable to install metal?enclosed buses for the generator leads instead of cable. These bus runs are of the same general design and construction as in metal-clad switchgear and can easily be co-ordinated with it.

For currents in excess of 2000 amperes two generator breakers operating simultaneously are used, since from the standpoint of economy, physical size, and available switchgear designs it would be objectionable to use breakers of higher ampere rating. It is essential that the two parallel paths have approximately the same resistance so the current will divide nearly equally through the breakers.

Generators can be protected against excessive temperatures by means of thermal relays, but this is not done in attended stations. The usual practice is to connect temperature detector coils embedded in the generator windings to a temperature indictor or recorder mounted on the switchboard. By means of a selector switch any one of a number of coils may be selected for the purpose of checking the highest temperature.

(2) Main Generator Bus Sections

In the synchronizing bus arrangement each generator is connected to its bus section and in turn is connected to the common synchronizing bus through current limiting reactors. The load is divided so that normally each generator carries the load connected to its bus section and there is very little transfer of power through the synchronizing bus and reactors. The reactors come into play primarily to limit the short circuit current on the feeder circuits.

Modern switchgear for the control of generator and feeder circuits is of the metal-clad type, totally-enclosed, with insulated buses and connections, and with complete isolation of component parts of the switchgear. The likelihood of a bus fault in this switchgear is remote and in general it is not felt that the added expense and complications warrant protection of the buses. Installations involving open, bare, or exposed buses and connections should be protected.

Many forms of bus protection schemes have been devised with modifications of the same scheme, such as overcurrent, differential, linear couplers, fault bus, etc. In general a differential scheme similar to the one described for generators is satisfactory. All incoming power to the bus is balanced

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against all outgoing power and any fault within the differential zone will clear the bus. Where a number of circuits is involved the relay should have several restraint coils to provide a variable percentage characteristic. This feature prevents false operation of the relay due to difference in d-c component currents and unequal saturation of the current transformers. In addition the relay is responsive to low fault currents which is desirable on grounded systems where the ground current is limited by a neutral impedance.

(3) Synchronizing Bus Tie Circuits—Synchronizing Bus and Current Limiting Reactors

Often because of space requirements, expense, physical limitations, and other reasons, synchronizing buses and the connections to them and the reactors are not enclosed, making them vulnerable to possible faults. Since at its best the synchronizing bus is a necessary evil, it should be well protected. Overload protection can be used, but again differentiial protection affords the best protection as the synchronizing bus, reactors, and the tie circuits can be included in the differential zone. The bus can be cleared quickly in event of a fault.

(4) Primary Feeder Circuits

These circuits emanate from the Generator Bus Sections and supply power to the motor load centers. Induction type overcurrent relays with instantaneous trip attachments protect these circuits. The inverse time element provides overload protection and with current and time adjustments can be co-ordinated with other relays and protective devices on the system. It also prevents tripping on momentary overloads and motor starting currents. The instantaneous trip attachments provide short circuit protection and clear the faulted circuit within a short time thus minimizing the disturbance to the system. On grounded systems a residual ground relay will provide more sensitive protection in particular on ground faults.

(5) 2300 Volt Motor Circuit and Motors

As indicated on the single line diagram (Figure 1) the circuits to the 2300-volt motors usually emanate from a load center. At this center is located a group of motor control equipment connected to a common bus. This equipment should incorporate protection for the feeder circuit to the motor as well as protection for the motor. The short circuit current requirements may be high since with respect to a "short" on the main generator bus it is limited only by the impedance in the feeder cable to the load center. High interrupting capacity fuses with fast clearing time will provide short circuit protection on the motor circuits, minimize shock to the system, and protect the motor starter. The motor starter in most cases is a magnetic contactor, electrically held in. This device is employed to start and stop the motor, and provide thermal overload and time delay undervoltage protection. Some engineers prefer an electrically operated breaker as the motor starter because of its "latched in" and other features of a breaker compared to a contactor. It must be rememberedf, however, that a breaker will not perform as well as a contactor on repetitive service, and the momentary rating may not be sufficient for the application.

(6) Stepdown Transformers

Transformers for converting 2300 volts to 440 volts for the smaller motors may be single phase or three phase, and liquid filled or dry type (air cooled). Within certain limits (within a setting of 250% of the full load current of the transformer bank) the primary feeder breaker may be used to protect the transformers connected to it, but where individual protection for the transformer is desired, fuses and disconnecting switches are used. The fuse should have sufficient interrupting capacity to meet the requirements. For protection against sustained overloads thermal relays are recommended. These are of the built-in type and measure copper temperature as a true indication of the load a transformer will carry without serious damage. The first contacts of the relay close at a predetermined temperature to give a lamp indication or alarm to the operator that the transformer is getting hot. At a higher temperature the second contacts will close to trip off part or all the load. This form of protection enables loading the transformer to its fullest capacity without damage.

(7) 440-Volt Feeder Circuits

The 440 volt feeder circuits emanate from the stepdown transformers. The device used for this protection is usually an air circuit

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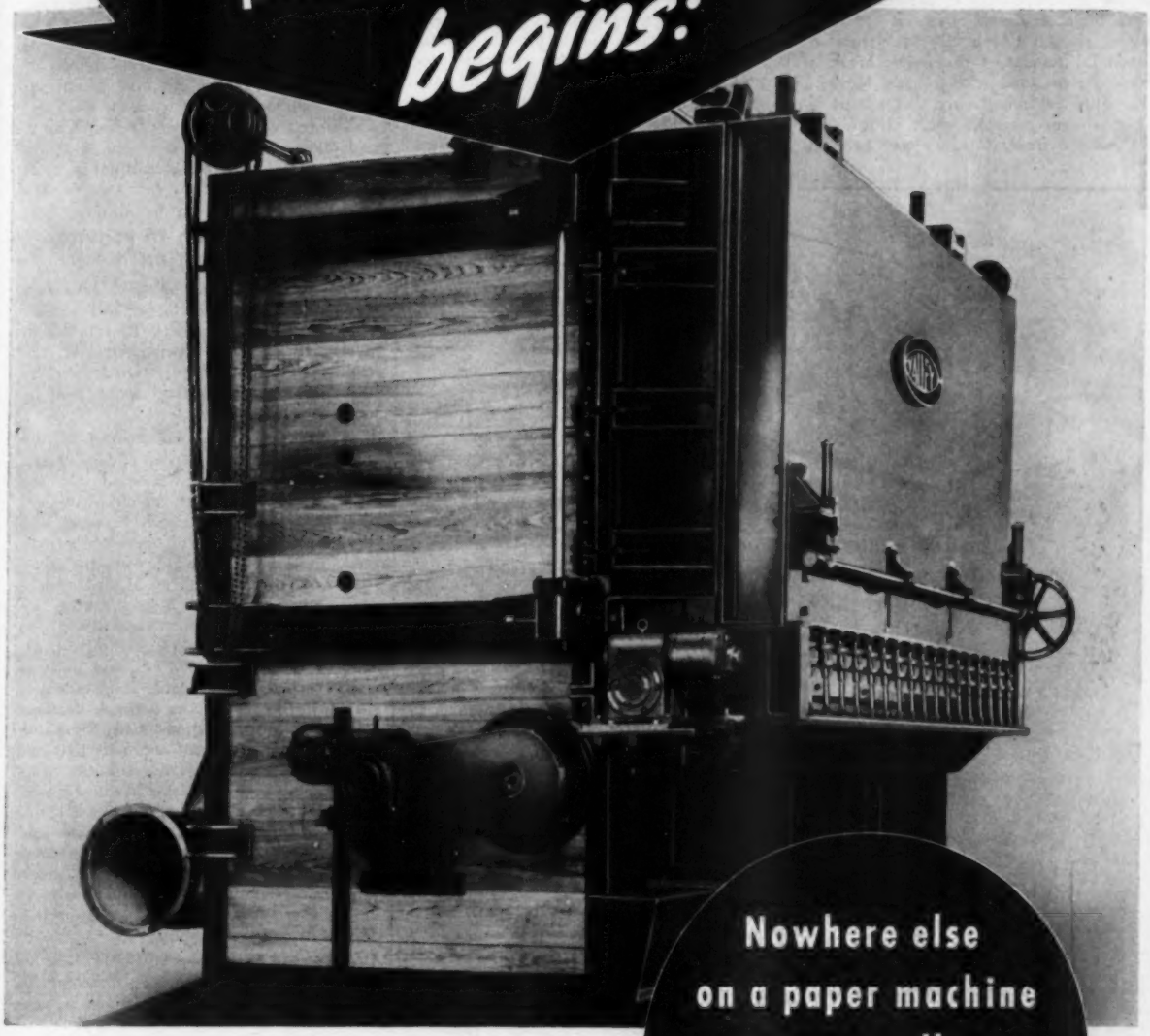

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breaker with built-in series trip coils of the dual overload type, which provide instantaneous magnetic trip for short circuit protection and inversetime protection on overload. The breakers are extremely fast in opening on short circuit, therefore must be capable of carrying and interrupting the momentary current produced by the fault. Depending on the capacity of the system and the size and impedance of the transformer banks, the short circuit current at 440 volts may figure such a high value that from an economical standpoint the feeder breakers should be cascaded with a main breaker. The main breaker is selected on the basis of the maximum available short circuit current but the feeder breakers may have an interrupting capacity rating one half that of the main breaker.

(8) 440-Volt Motors

The protection of the 440 volt motors follows the same pattern as for the 2300 volt motors. A combination starter is the accepted standard. This starter combines a device to provide short circuit protection for the circuit as well as a disconnecting means, and a magnetic starter for starting and stopping the motor and to provide thermal overload and time delay undervoltage protection. The short circuit device should have sufficient interrupting capacity for the application. An enclosed thermal type breaker with sealed in interchangeable trip elements and quick make and quick break contacts is recommended for this service.

(9) System Grounding

For a grounded system it is considered the best practice to ground the generators through a resistor. This will limit the ground fault current to the required value, reduce over and reflected voltages to a safe value, provide sensitive relay protection, and provide protection to equipment and personnel. A neutral breaker will insure clearing the generator from all sources of ground current flow in event of an internal fault by disconnecting it from the main bus and from the neutral bus. The advantages and disadvantages of a grounded system is a subject within itself and will not be dealt with in this paper.

APPARATUS USED TO PROVIDE PROTECTION

The protective relays must be associated with the proper switchgear and control equipment if the maximum benefits are to be realized. The type switchgear and control equipment with associated breakers and other arc interrupting devices will be described briefly below.

For the protection and control of the generators and main feeder circuits metal-clad switchgear is the standard. On the older installations steel cubicles with stationary mounted oil circuit breakers and disconnecting switches or open type switchgear were used. In recent years the trend has definitely swung to metal clad switchgear with removable type breakers, insulated buses and connections, silverplated and compound filled joints, complete isolation of component parts, etc., and today it is the recognized standard. It incorporates to the fullest extent the desirable features of dead front construction, safety, flexibiilty, interchangeability, fast and effective arc interruption, and ample interrupting capacity. The removable breaker feature insures complete safety to the operator, ease of inspection and adjustment, and ease and speed of breaker replacement. All breakers of the same type and rating are interchangeable. Positive mechanical interlocks prevent removing or inserting the breaker unless it is open.

The breakers may be oil or air. The air circuit breaker with its many inherent advantages is fast gaining favor and in general is recommended. For some applications such as for extreme atmospheric conditions and in explosive atmospheres the oil circuit breaker is preferred. For match up purposes as extensions to existing installations where oil circuit breakers are installed it is desirable to continue with the original design. Switchgear of this type is built up to and including breakers having an interrupting capacity of 500,000 Kva, 15 Kv and as low as 50,000 Kva, 5 Kv. A metal clad unit with drawout air circuit breaker is shown in Figure 3.

In applying circuit breakers, the ampere, voltage, interrupting, momentary, and interrupting capacity limitation ratings must be taken into consideration. The first two are determined by the circuit on which the breaker is used. The others are determined by the total capacity of the system. Breakers of this type have a NEMA Classification of

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an 8 cycle arc clearing time and are applied on that basis. In calculating the interrupting rating the following factors determine the selection:

(a) Subtransient reactance of all generators.

(b) Transient reactance of all synchronous motors. The reactance of induction motors is neglected. The multiplying factor is one (1).

The momentary current occurring during the first half cycle of the fault and which effects the mechanical stresses and momentary rating of the breaker, is determined by the following factors

(a) Subtransient reactance of all generators

(b) Subtransient reactance of all synchronous motors

(c) Subtransient reactance of all induction motors

The multiplying factor is 1.6

Thus it is seen that the initial inrush current the breaker must carry before it opens the fault is something in excess of 1.6 times the short circuit current to be opened by it. Breakers having a momentary rating greater than 60,000 amperes would be prohibitive from a cost standpoint and physical size. At 2400 volts a majority of paper mill installations would produce more than 60,000 ampere momentary current on fault. The synchronizing bus and reactors are used to limit the momentary current to 60,000 amperes. If this is done the fault current is automatically limited to some value under 150,000 Kva, therefore the most economical breaker for 2400 volt feeder circuits is 1200 ampere, 150,000 Kv-.a. interrupting capacity. The limiting factor in applying breakers on 2400 volt service is the momentary rating rather than the interrupting rating.

It is not possible to place too much emphasis on the interrupting capacity requirements of breakers including the momentary rating and the interrupting capacity limitations. Except by the use of reactors, or a higher system voltage which will reduce the momentary current in direct proportion to the voltage and will help the interrupting capacity limitation, nothing can be done to reduce the interrupting requirements of the main feeder circuit breakers. Breakers having all the requirements of sufficient interrupting capacity as described above, should be installed, and preferably of the enclosed metal clad type. After all the switchgear is the heart of the electrical system and as such should be treated accordingly. In some existing installations it might be feasible to modernize the old breakers or replace them with larger breakers, but in general the correct answer is new metal clad switchgear. The existing switchgear could probably be utilized at some distribution center. With the use of 1200 ampere breakers the number of primary feeders could probably be reduced.

Similar switchgear to that described for the main feeder circuits may also be used for the synchronizing bus tie feeders and incorporated as an integral part of it if so desired. If the reactors can be located near the main switchgear and treated as a bus extension to same, breakers on the synchronizing bus tie feeders can be replaced with

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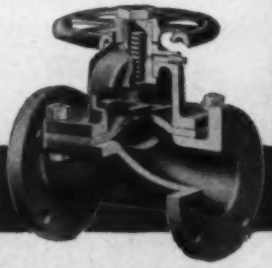

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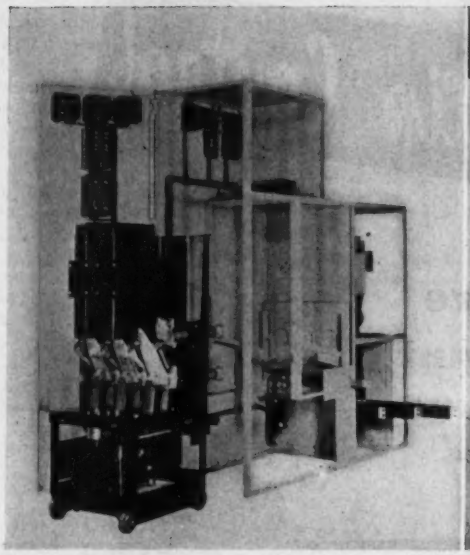


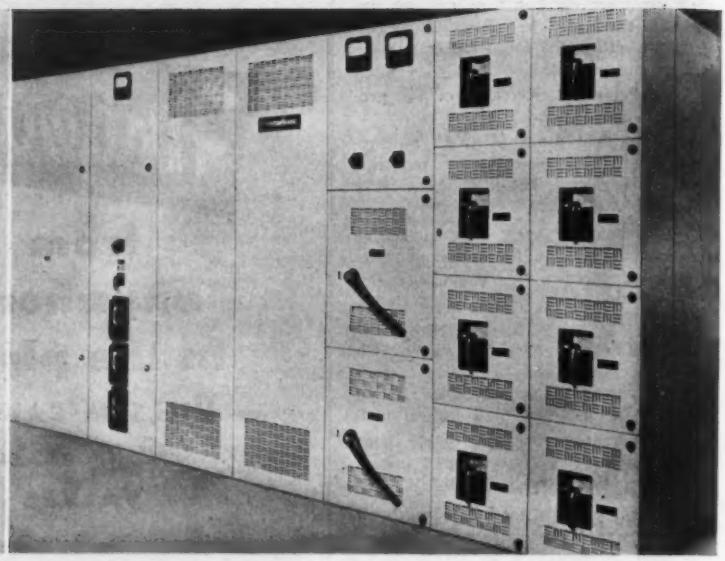


Fig. 3 (left)—Metal clad switchgear unit with drawout air circuit breaker. . . . Fig. 5 (right) Power center with air-cooled transformer and drawout air circuit breakers

disconnecting switches. Sometimes the breakers or disconnecting switches are combined with the reactors and even with the synchronizing bus in a metal enclosed assembly. In such cases consideration must be given to the temperature rise and other problems associated with reactors and high current capacity enclosed buses.

The primary distribution system in a paper mill should be given careful thought and study as to voltage, capacity, number of circuits, flexibility and type of system. The radial system is commonly employed, but should be supplemented by a spare (or spares) feeder or emergency ties. Loop feeders, simple spot network, or primary selective network systems may be used. Each individual mill will have to be studied to arrive at the best solution, all phases considered.

Regardless of the details of the primary distribution system it is important that the power be carried to distribution points located at load centers throughout the mill where it is distributed at the same voltage to the larger motors and at 440 volts to the smaller motors. This system of distribution has been aided by the development of suitable 2300 volt motor control equipment and power centers for the 440 volt distribution. It has many advantages including (1) saving in cable, (2) less voltage drop, (3) better regulation, and (4) by the use of smaller transformer the short circuit currents on 440 volts are reduced.

The development of high interrupting starters for 2300 (and 4160) volt service has been most helpful. The cost of breakers having the required interrupting capacity and of the metal clad type would be prohibitive. Equipment meeting the requirements outlined above for circuit and motor protection is assembled in metal enclosed cubicles with a common bus and with safety and interlocking features to form a group assembly for each load center. The cubicles are self contained, factory built, assembled, and tested, and shipped in assembled sections. Short circuit protection is provided by current limiting fuses, used also as disconnects to isolate the starter for maintenance and servicing operations. The interrupting capacity of the fuse is based on the instantaneous asymmetrical short circuit current occurring during the first half cycle of fault as outlined below for low voltage air circuit breakers.

The motor starter is a high interrupting capacity contactor of the oil immersed or air break type, or an electrically operated oil circuit breaker. This device provides complete motor protection against sustained overloads, locked rotor, undervoltage, and too frequent starting.

The enclosed cubicle with segregated compartments for fuses, starters, and low voltage control provides the maximum protection for inspection and maintenance. The co-ordinated design of fuses and starter protects the system, the motor, and the starter under fault conditions. Existing starters of insufficient interrupting capacity and safety features can usually be replaced with modern enclosed cubicle.

The introduction of reliable 3-phase transformers of the non-inflammable fluid and aircooled type, throat connected or close-coupled (in case of air cooled units) to

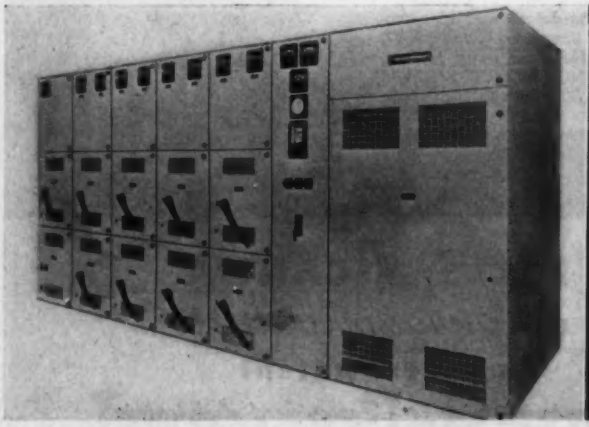
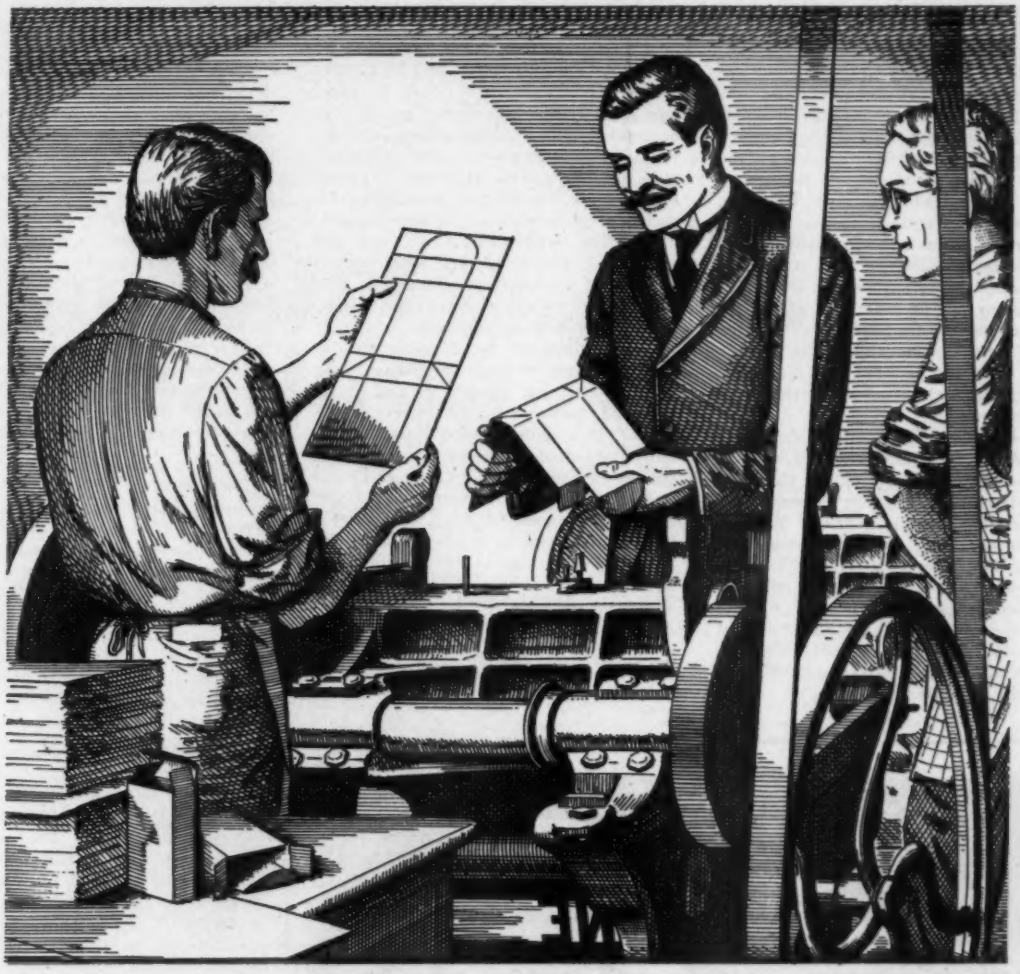


Fig. 6 (left)—Low voltage metal-enclosed switchboard with main and feeder breakers drawout type. . . . Fig. 7 (right)—Motor control center for 440-volt motors



The Accident that Revolutionized Box Making

In 1879, Robert Gair noted that a rule had cut through the paper of some seed bags printed in his shop. The bags were a loss, but the accident gave Gair an idea. If a printer's rule which had become sharp could cut paper, perhaps it would also cut cardboard. If so, why not use a combination of sharp and dull rules to cut and crease folding boxes in a single operation, thus making economical mass production possible? It worked! At first, printing presses were used to form small folding boxes, but soon special machines were turning out large boxes, their exteriors printed, lithographed and embossed.

Robert Gair's accidental discovery revolutionized box making, had a far-reaching effect on packing, shipping and merchandising. Thus began one of the most important developments in the progress of the essential paper and paper-board industries.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

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metal enclosed switchgear with drawout air circuit breakers to form a power center, has made possible the load center distribution system for paper mills. The power center includes primary facilities for protection, disconnecting and transfer means, and cable or feeder termination. These are mounted integral with the transformer in a terminal chamber or an auxiliary compartment. The disconnecting switches are of the magnetizing break type suitable for the primary distribution system and if necessary may be of the load break type. The fuses have high interrupting capacity to meet system requirements and with blowing characteristic for coordinating with relays and other protective devices on the system.

Provisions can be made for adding air blast equipment in the future to increase the nominal rating or fans can be added initially for this purpose.

Thermal protection can be provided and is recommended.

The 440 volt switchgear is of the metal-enclosed type involving air circuit breakers of the drawout type. It can be combined with the transformer to form a power center or it may be a separate assembly. For new mills or expansion to existing mills the power center is recommended. It is desirable to keep the transformer sizes relatively low, within 1500 kv.-a. if possible, so as to reduce the value of the short circuit current on the 440 volt side. This eliminates the necessity of a main breaker cascaded with the feeder breakers.

For existing installations where it is not feasible or practical to replace the transformers, a system study will probably reveal the inadequacy of the existing 440 volt switchgear from every standpoint of safety, interrupting capacity, circuit protection, accessibility, reliability, and flexibility. Unfortunately in the past too little attention was paid to the interrupting capacity requirements on low voltage systems with the result that a large percentage of old installations, particularly the ones with oil circuit breakers, fall far short of interrupting capacity, circuit protection and other requirements. The development of the new low voltage air circuit breaker with modern methods of arc interruption and improved tripping features and contacts has solved this problem. Modern switchgear of the type described includes all the desirable features and advantages of safety, protection, flexibility, interrupting capacity, ease of operation and maintenance, and continuity of service. It is of the "package" type factory assembled, wired and tested, and shipped in one or more sections so it can be easily and quickly installed. Instruments and meters are mounted on the front hinged panels. A typical installation of a power center with air-cooled transformer is shown in Figure 5. A low-voltage, metal-enclosed switchboard with main and feeder breakers, drawout type is shown in Figure 6.

In applying air circuit breakers, it must not be overlooked that on low voltage systems they are rated in amperes interrupting capacity and the interrupting capacity must correspond to the fault current during the first half cycle, or the initial inrush current. This takes into consideration the motor contribution as well as the transformer contribution. It is determined by calculating the average value of short circuit current at the end of the first half cycle by including the impedance of the primary system, the transformer impedance, subtransient reactances of synchronous and induction motors, and reactance values of all intervening portions of the circuit to the point of the fault, including the conductors, bus runs, current transformers, circuit breakers, etc. The instantaneous symmetrical current thus calculated is multiplied by 1.25 to obtain the instantaneous asymmetrical current on which the breaker rating is based. If the fault is calculated to be in excess of 50,000 amperes, from an economical standpoint it is best to cascade a main 100,000 ampere interrupting capacity breaker with 50,000 ampere interrupting capacity feeder breakers.

The secondary distribution system described above is of the radial type. Secondary network systems may be used, and they provide the maximum protection and advantages from the standpoint of flexibility and service reliability, exceptionally uniform and good voltage regulation, high efficiency, future expansion, and the highest quality and continuity of service with a minimum of operating and maintenance expense. Power centers for secondary network systems are available.

From the 440-volt feeder switchgear circuits emanate to secondary load centers at which point motor starters are located for the individual control and protection of the 440-volt motors. In new mills and in many old mills it is advantageous to centralize the control in factory built, assembled, and enclosed groups, designated as control centers! This arrangement provides more space at the motors, convenient and accessible location of the control centers in practically any desired arrangement and form, reduced installation cost, reduced maintenance, greater flexibility, and compactness. Future expansions are easily provided for as well as changes in size of starters. The dimensions are standardized by having the same width and depth with only the height varying with different size starters but in multiples of each other resulting in the greatest degree of flexibility and interchangeability.

The two essential elements of the combination starter are the breaker or fused disconnect for instantaneous short circuit protection and disconnecting means for the contactor, and the magnetic contactor for starting, stopping, and protecting the motor. Each combination starter is mounted in its own compartment with complete isolation from others in the same structure, and from the buses and connections.

Complete prewiring at the factory to individual and master terminal boards means fast, easy, and simple installation with less cost. Electrical interlocking or sequence starting and stopping of the motors for special operations can be done simply and easily in a Control Center. Lighting circuits and feeder circuits to some remote mounted

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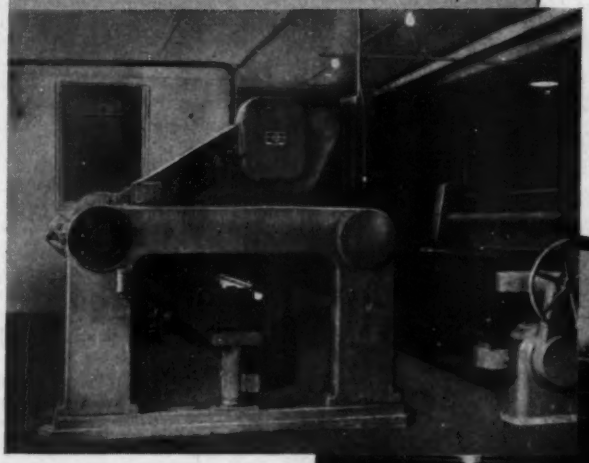

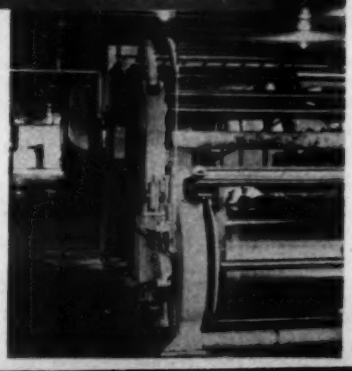

Above: WALDRON Microjet Coating Unit featuring air blade applies high solid coating at Newton Falls Paper Mill, weights of four to six pounds, 25x38 (500) ream basis, and has the ability to apply even the highest weights of Baryta coatings.

At right: Winder end of Microjet line showing WALDRON Tension Rig and WALDRON Automatic Winder.

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starters can be incorporated in the control center.

The breaker or device used for short circuit protection, being instantaneous in operation, is applied in the same manner as the 440 volt feeder breakers, namely on the basis of the instantaneous asymmetrical short circuit current at the point of the fault. A typical control center for paper mill application is shown in Figure 7.

It is important that the Control Centers be located at load centers so as to keep the length of the circuits to the motors to a minimum. For new mills and expansions to old ones this can usually be accomplished by making a systematic layout and study. In modernizing old mills it may mean relocating and grouping the motor starters with associated changes in the circuits.

Switchgear for system and generator grounding should preferably be of the metal clad type with removable breakers, single pole, and having ample interruption and voltage rating for the particular application.

Particular emphasis has been placed on interrupting capacity requirements of all breakers and arc interrupting devices on the system, safety, accessibility, flexibility, reliability, and last but not least, adequate apparatus and circuit protection. If the maximum results are to be reflected in the operation of a mill, the protective relays, protective devices, switchgear, and control equipment used must comply with and provide these requirements. Such equipment has been developed and is available. It is recommended that a study, preferably with an a-c network calculator, be made of the electrical system to determine the short circuit current, voltage, load and other requirements, all of which are factors in determining the best arrangement and equipment for a particular mill.

A New Approach to Slime Control

FREDERIC A. SODERBERG
Director of Paper Service and Development
General Dyestuff Corporation

Once upon a time a paper mill superintendent reading his morning paper in a luxurious air-conditioned office paused for a moment to press a button beside his desk. Before returning to the paper, he looked through a picture window and watched the paper machines start up without the help of operating crews. The paper as it reached the reels was perfect in every respect; basis weight, finish, mullen, tear, fold and color were all up to specifications. At that point unfortunately an alarm clock disturbed his slumbers, reminding him that it was four o'clock on Monday morning. He awakened to the grim reality that paper manufacture requires constant supervision.

During the past few years, it has been popular to believe that chemicals dropped into the papermaking system will, without further thought or manipulation, completely eliminate all slime trouble. The superintendent has not accepted this theory due primarily to his many years of experience with a manufacturing process that involves an amazing number of variables. He demands that any product offered for slime control have maximum effectiveness, low cost and ease of manipulation. The superintendent also realizes that the end result of any application of chemicals such as size, alum, dyestuffs or slimicides depends largely upon the ability of the mill personnel to make them work satisfactorily under ever-changing conditions.

Before describing this new approach to slime control, it may be well to list certain questions which have been asked by both consumers and suppliers over a period of years.

Nine Negatives of Slime Control

1. Can slime in the paper industry be controlled efficiently for any reasonable length of time by the use of one toxicant? No!

2. Is the application of a locked mixture of slimicides flexible or economical? No!

3. Are there any "high-pressure-mystery" chemicals with exceptional curative powers available for this work? No!

4. Will the wise consumer buy a toxicant when the chemical name of the product is not given? No!

5. Do materials which are adulterated with water, soda ash, fillers, etc., offer good money value? No!

6. Are ready-made directions available for eradicating slime in all mills or even on a single machine in one mill? No!

7. May we say that bactericides and fungicides are the only chemicals worth consideration in the elimination of slime growths? No!

8. Should the chemical side of slime regulation receive sole consideration while mechanical corrections are totally disregarded? No!

9. Does a trial of one or two weeks' duration give the superintendent a correct evaluation of slimicides? No!

Relation to Dyestuff Manipulation

In dealing with slime control, many of the problems which arise are similar to those encountered in the coloring of paper. First, the dyestuffs have to conform with existing conditions and must not upset operating procedure. It is also a generally accepted fact that no one dyestuff or single mixture of dyestuffs will produce a uniform shade. The reason is obvious since variations in water, pulp, temperature and chemicals may affect the final hue. If water, plup, temperature, chemicals and air play an important part in slime formation, then the parallel is established. The same supervision and care which insures uniformly colored paper or paperboard will be effective when applied to slime elimination. From the microbiological standpoint, slime as it occurs in the papermaking system is far too complex to be controlled by a single toxicant. When the various physical forms of slime, as observed by the paper industry are considered, it is also clearly evident that mechanical as well as chemical means must be utilized to insure effective slime control.

Definition of Slime

It would seem logical to define slime; not as it is reproduced in a laboratory, not as it is collected on slime boards in accessible locations in the mill, but rather as it accumulates and grows in places where stock moves slowly; where tanks are without proper agitation and where "dead spots" are rarely reached by operators during cleanup periods. These are the critical points of infection and as such form the objectives toward which all control methods should be pointed.

Paper mill slime is an ever-changing accumulation of bacteria, fungi, adhesives and spatter. The adhesives such as pitch, size, starch, etc., agglomerate and collect on the sides of chests, pipes and other pulp and papermaking equipment. Spatter, which is composed of fine fiber, dirt and chemicals contained in the furnish, adheres to the sticky base forming a mat. Bacteria and fungi attach themselves to this rich feeding ground and grow abundantly. As these

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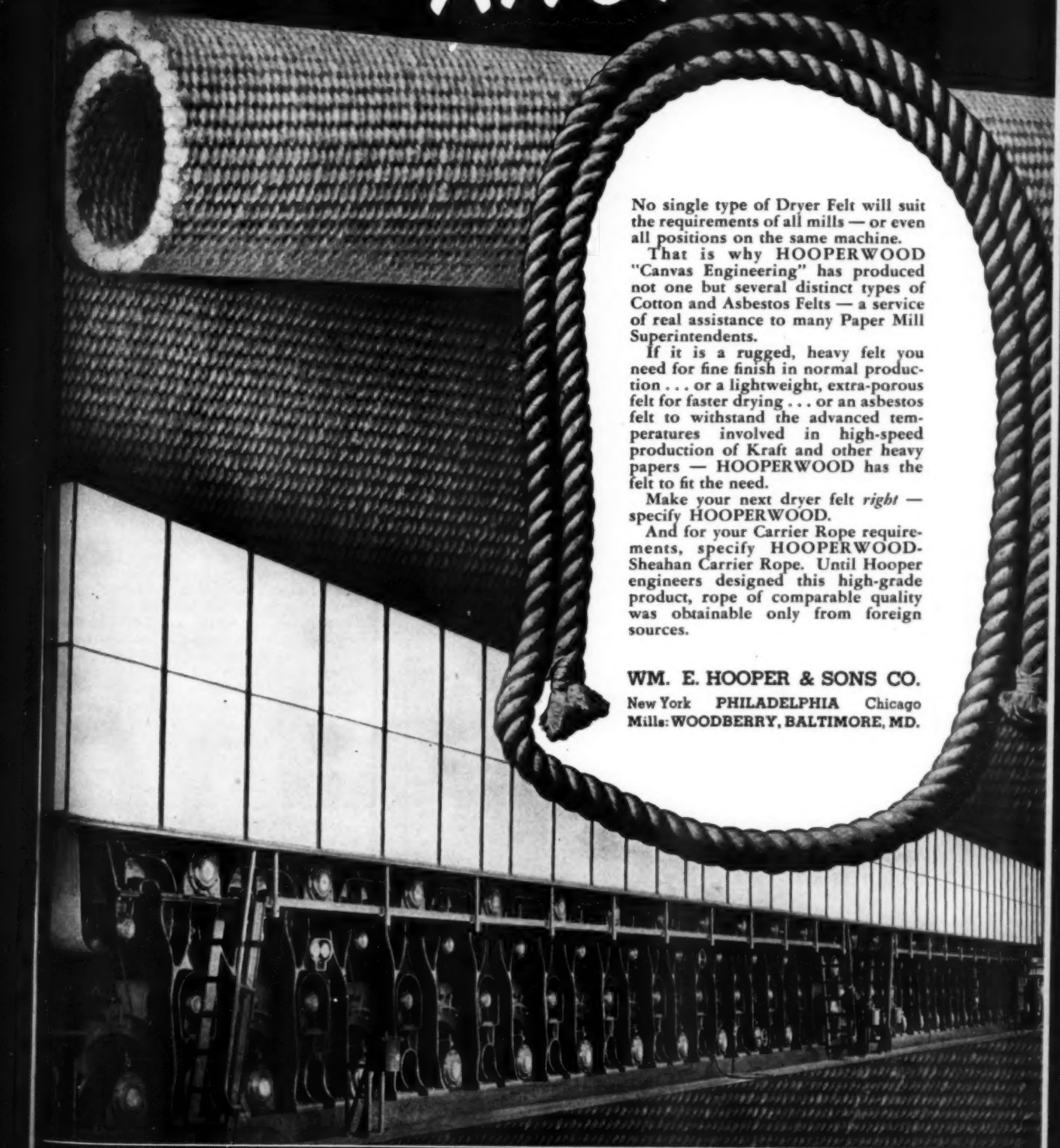

No single type of Dryer Felt will suit the requirements of all mills — or even all positions on the same machine.

That is why HOOPERWOOD "Canvas Engineering" has produced not one but several distinct types of Cotton and Asbestos Felts — a service of real assistance to many Paper Mill Superintendents.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an asbestos felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers — HOOPERWOOD has the felt to fit the need.

Make your next dryer felt *right* — specify HOOPERWOOD.

And for your Carrier Rope requirements, specify HOOPERWOOD-Sheahan Carrier Rope. Until Hooper engineers designed this high-grade product, rope of comparable quality was obtainable only from foreign sources.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS

accumulations become top heavy, they drop off and find another resting place generally on the machine or in the paper web.

If such a condition is to be corrected by mechanical and chemical means, we may divide the control procedure further:

Mechanical:

1. Equipment Changes
   (a) Stream line flow
   (b) Smooth Surfaces
2. Good Housekeeping
   (a) Periodic Cleanups
   (b) Equipment Repair

Chemical:

1. Anticoagulants
   (a) Adhesive Dispersion
   (b) Prevention of fine accumulation
2. Toxicants
   (a) Bactericides
   (b) Fungicides

Slime Control Requirements

Briefly, our over-all objective is smooth flow of stock through a clean, streamline system, the prevention of adhesive accumulations, the dispersion of fines or spatter and the control of bacterial or fungal growths. We are quite sure that each and every one of these preventative measures cannot be applied immediately in all pulp and paper plants.

Mills which have been operating for many years are full of dead spots where slime may accumulate. Tanks with outlets above the floor, pipe sections that have been sealed at one end, screens without scrapers, chests with insufficient agitation, beaters with attachments that collect spatter, pipe lines with an excessive number of bends, all serve to retard the flow of stock.

Smooth surfaced equipment will to some extent prevent the agglomeration of adhesives. When replacements are made, the type of metal or other material which is used should receive prime consideration. It is also very worth while to investigate the various types of coatings which are being offered at present. If they prevent slime lodgements, their adaptation will be beneficial.

It is impossible to say too much about the value of good housekeeping in the average mill. Thorough cleaning with hot water, alkali and a dispersing agent is prerequisite to any serious attempt to control microflora. Machine time that may be lost during a thorough washup is negligible when improved quality of product and increased production which ensue are taken into consideration. Equipment breakdowns that do not otherwise seriously affect the papermaking process may be responsible for troublesome slime growths. Shower pipes, scrapers, save-alls, screens and agitators should be constantly watched and repaired without delay.

So much for the mechanical side of slime control. Now let us turn to the chemical phase. After several years of experimenting with a host of compounds, mill men know that no single product or fixed combination of toxicants will deliver such effective slime control over long periods of time when applied in quantities that are economically feasible.

They realize that some types of slime organisms cannot possibly be eradicated by one slimicide, or even by locked mixtures of slimicides whose application can only be carried lineally and which will not cope with the ever-changing types of infection except in exorbitant and wasteful dosages.

The necessary tools for adequate slime control are:

1. Hot water, alkali and an effective dispersing agent to clean the system thoroughly. All old accumulations of adhesives, spatter, fungi and bacteria should be completely removed.

2. A dispersing agent which may be added regularly to the system in small dosages, thereby preventing agglomeration of adhesives. This treatment will also forestall any buildup of feeding materials and colonies of micro-organisms.

3. An outstanding bactericide to render the capsulated bacteria and other slime formers in this category impotent.

4. An effective fungicide to take care of the growths which are immune to the bactericides.

We have called this a new approach to slime control. It is new but only insofar as two to three years of practical use in a number of pulp, paper and paperboard mills have served as a fair trial period. In each instance, quality has been maintained throughout the various seasons of the year, production has increased and the average control cost has been comparatively low.

Co-operation of Mill Personnel

The prime reason for the success of this method is the interest which it has aroused in the minds of the mill men directly responsible for slime elimination. They realize that only their proper manipulation of the chemicals has kept the microflora under subjugation. It has been solely their efforts and zeal which have developed this technique. These men feel that a quantitative slime analysis by a bacteriological laboratory may be of academic interest but not sufficiently flexible for constant use. The time factor necessary for plating, incubation and identification mitigates against the employment of this method. By the time a report on a slime sample is returned to the plant, the offending organisms may have changed radically. Furthermore, a large increase in total bacteria count sometimes accompanies a marked reduction in slime trouble.

The slime board is another innovation which these men use. They do not question the fact that such equipment will measure an increase in slime accumulation at any given point. There is a growing feeling among mill operators, however, that by the time the board test detects an abnormal buildup of slime, the whole system is thoroughly infected. They must then fight this condition with their backs more or less against the wall. Only two avenues of escape are open. One is to shut down and clean thoroughly, the other, to use killing dosages of bactericides and fungicides. The first entails loss of production, while the second practically guarantees an excessive toxicant cost.

Here we see the definite value of close adherence to the old adage "an ounce of prevention is worth a pound of cure."

Supercalender Rolls
Capacity up to 250" face

Embossing Rolls
Matrix rolls, paper or felt, and engraved rolls

Embossing Machines
Constructed for heavy duty work

Laboratory Calenders
Especially equipped for control or research work

Special Anti-Friction Installations
Permitting higher speeds on existing equipment

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Dynamically balanced for high speed

The Wheeler Roll Co.
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State of California
GOVERNOR'S OFFICE
SACRAMENTO

EARL WARREN
GOVERNOR

To American Industry:

In California we are currently celebrating the centennial anniversaries of the beginnings of our State. We gain much inspiration from our review of the progress which has been made in the comparatively short span of one hundred years.

During the past eight and one-half years alone California's population has increased by 47 per cent and our industry and agriculture have risen to positions of great importance in the economic life of the nation.

Our tremendous reserves of natural resources and our strategic world trade position on the shores of the Pacific Basin assure California's continued progress in the years to come.

I am happy, therefore, to join in inviting you to investigate the opportunities for expansion which exist in the many communities of our State.

Sincerely,

Governor

Earl Warren

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
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Road of the Daily Streamliners

New Slime Control Method

It has been mentioned that effective treatment will vary from mill to mill and even two machines drawing stock from the same identical chest may require entirely different control and adjustments. If a simple infallible "one product method" of slime control were feasible, water, pulp, temperature, chemicals and air would have to co-operate far more than has been their custom in the past.

With three unrelated chemicals, an outstanding dispersing agent, a condensation product of naphthalene sulphonic acid (Blancol Conc. Powder), the powerful bactericide, phenyl mercuric lactate (Puratized SC) and the effective non-toxic fungicide dihydroxydichlorodiphenylmethane (Preventol GD), mill operators are able to attack slime on a three dimensional basis. The possible combinations of these chemicals are many and sufficiently flexible to meet the varied conditions which have been enumerated.

Various modifications of the following pattern will in most cases take care of the important chemical phase of slime treatment:

A. Clean Up: Hot water, Alkali, Anticoagulant (Blancol Conc. Pdr.)

B. Keep System Clean: Anticoagulant (Blancol Conc. Pdr.)

C. Control Bacteria: Mercuric compound (Puratized SC)

D. Destroy Fungi: Fungicide (Preventol GD)

This treatment in its entirety is designed to produce top-quality production at low cost with an absolute minimum of lost time due to process interruption. Whether or not the individual plant adopts all or part of these suggestions depends wholly upon localized conditions and results which are desired. Perhaps, for example, slime spots in the paper without an excessive number of machine breaks will be tolerated. In that case, the use of the anticoagulant alone might suffice. Other plants may be satisfied with the partial elimination of microflora. This can be taken care of with varying amounts of mercuric compound and the anticoagulant. Then too, there are certain end uses which may rule out toxic materials. Two nonirritant, nontoxic products the fungicide, which has bactericidal properties and the anticoagulant are suggested. The application of these chemicals in properly balanced quantities at strategic locations will be highly beneficial.

At the beginning of this discussion, we offered nine questions with negative answers covering some of the important decisions which will be made by paper mill operators. The points covered herein may be summarized by an additional set of questions.

Nine Positives of Slime Control

1. Are mechanical corrections as well as the application of chemicals important? Yes!
2. Should good housekeeping receive prime consideration? Yes!
3. When the chemical nature of a toxicant is not revealed, would it be advisable to refuse a trial? Yes!
4. If a mill cleans up, prevents adhesive agglomeration, controls bacteria and destroys fungi, will the slime trouble be reduced to a minimum? Yes!
5. Does the use of three totally unrelated chemicals offer low cost, flexibility and high efficiency? Yes!
6. For a fair comparison should a trial treatment extend over a period of from four to twelve weeks? Yes!
7. Do some types of fungi and bacteria grow rapidly in the presence of a single toxicant? Yes!
8. Do adjustments in the quantities of chemicals added to the papermaking system successfully counteract changes in microflora? Yes!
9. Is the efficiency of this new approach dependent to a large extent upon the interested co-operation of mill operators? Yes!

You, as superintendents, are the ones most concerned with the effect of slime upon mill operation. Down through the years you have watched your equipment, sometimes for hours on end, tracing the causes of production breakdowns. This close attention to details is without question invaluable in combating the destructive effects of slime. When the proper tools are placed in the hands of progressive production executives, the horizons of accomplishment are unlimited.

Electric Drives with Fluid Couplings for Materials Handling Equipment and Power Driven Machinery

FRED W. ATZ, JR., Elec. Engineer
Link-Belt Co. (Philadelphia)

The Electrofluid Drive is a new and revolutionary drive, engineered into a compact integral unit, combining a standard general purpose motor with a fluid coupling. It is a highly efficient device, simple in principle and design. The fluid coupling consists of two main elements, impeller and runner, and transmits power entirely by the mass and velocity of moving oil between the two elements. The combined unit, motor and coupling, mounted in a cast iron housing, meeting N.E.M.A. motor dimensions, forms a packaged unit ready for operation.

Beyond the small horsepower ratings, up to and including N.E.M.A. frame 364, the size and rating of the fluid coupling is unlimited that can be designed and built in any individual unit or development for standardized equipment.

The object of the Electrofluid Drive is to assure:

Smooth operation, eliminating shock loads, impacts, torsional vibration and strains to the driven load.

Smooth acceleration.

Protection to the electric motor.

Utilizing maximum torque of the driving motor.

Limiting stalled torque value.

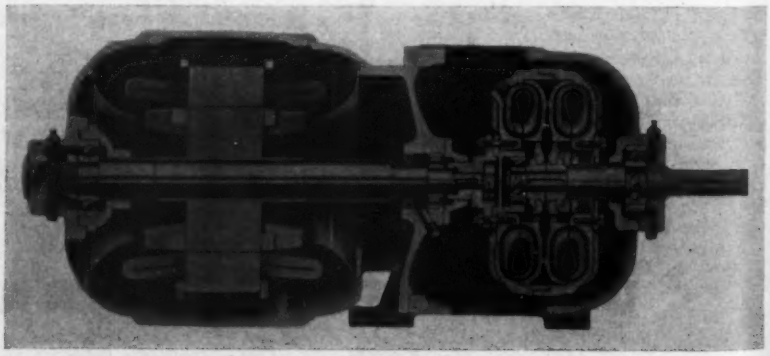
The Electrofluid Drive

Hydraulic drives and couplings are classified into two general groups, constant and variable speed. These couplings are also known as fluid couplings, fluid drives, hydraulic drives and hydraulic clutches. Combining the fluid coupling with a standard general purpose motor becomes what is known as the Electrofluid Drive.

The coupling is made of two main parts —runner and impeller. All are of the double circuit type (two runners and two impellers) except the one, and one and one-half horsepower sizes which are of the single circuit type (one runner and one impeller). The driver or motor end is called the impeller; the driven or load end is called the runner. No metallic connection exists between the runners and impellers. In the double circuit units, the two impellers are mechanically connected to function as a unit; likewise, the two runners are positively connected to function as a unit. The coupling is filled with a light mineral oil of steam-turbine quality. When the motor drives the impeller, it causes oil to flow through the runner buckets back to the impeller, thereby rotating the runner through the medium of the oil. The term circuit refers to the oil medium through which power is transmitted entirely by the mass and velocity of moving oil from the impeller to the runner. The motor rotates the impeller, the multiple blades of which force a continuous flow of oil against the multiple blades of the runner. The runner rotates, establishing the circuit by which the power is transmitted from impeller to runner.

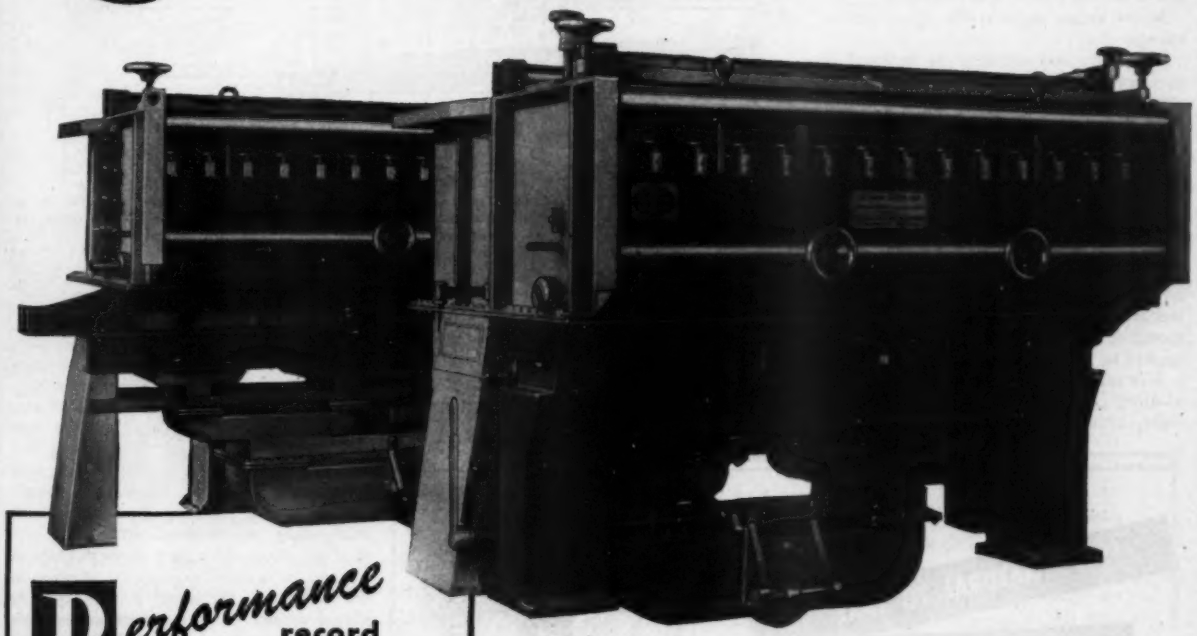
Primarily a constant speed unit, it is designed for 1800 rpm synchronous speed, 1730 rpm full load speed. However, it can also be used on 25 and 50 cycle alternating current, having full load input speeds of about 1450 rpm. At these speeds, the coupling operates at reduced rating, and in some cases oversize couplings, must be used.

Acceleration, which is always of a smooth nature, depends on the inertia of the driven load—the greater the inertia, the longer the time of acceleration. This is true, for ex-



A cross section of the Electrofluid Drive, an integral unit

Uniform pond-to-wire delivery with Sandy Hill flow control units



Performance record

1—Speed stepped up 20%

2—Produces wider sheet in relation to slice width

3—Makes superior looking sheet

4—Spread under dandy is more uniform

5—Immediately increases use of water in the sheet

6—Good supercalender operation with paper produced at increased speed

THESE Sandy Hill flow control units are widely adaptable. They are adjustable to both high and low slices and equally good results are gained at high or low speed, or when a secondary slice is desirable.

Built into these units are the acclaimed advantages of two Sandy Hill products—the Bertrams Flow Distributor and the Neilson Slice. With these flow control units, paper may be made with the finest of caliper control and fiber distribution.

The slice may be pivot-carried, allowing advancement or retraction. Units come custom built, and are available for use with either deckle straps or ruler edge deckles.

Sandy Hill Iron & Brass Works

Hudson Falls, N. Y.

MANUFACTURERS OF
Adjustable Cylinder Vats
Cylinder Paper Machines
Pulp Grinders
Dandy Roll Drives

Pulpers or Kneaders, Voith
Thickeners
Quick Opening Gate Valves
Bertrams Flow Distributors
Bertrams Shakes

Neilson Slice
Feltless Wet Machines
"Selective" and Corner Drives
Fourdrinier Paper Machines
"Packer" Screens

Castings
Bleaching Equipment
Scofield Felt Conditioners
Cleveland Type Bearings
Shaker Screens

ample, of machines with heavy flywheels including shears, punch presses, bending rolls, fans, blowers, pumps, etc. In every case, the initial acceleration is more prolonged with the Electrofluid Drive than when the connection between motor and driven equipment is solid or of a positive nature. Also, the current peaks are lower during the period of acceleration and maximum load conditions when the flywheel effect gives up its energy.

The characteristics of the Electrofluid Drive are such that the horsepower transmitted varies in proportion to the cube of the speed.

Torque varies as the square of the speed and to the 5th power of the diameter.

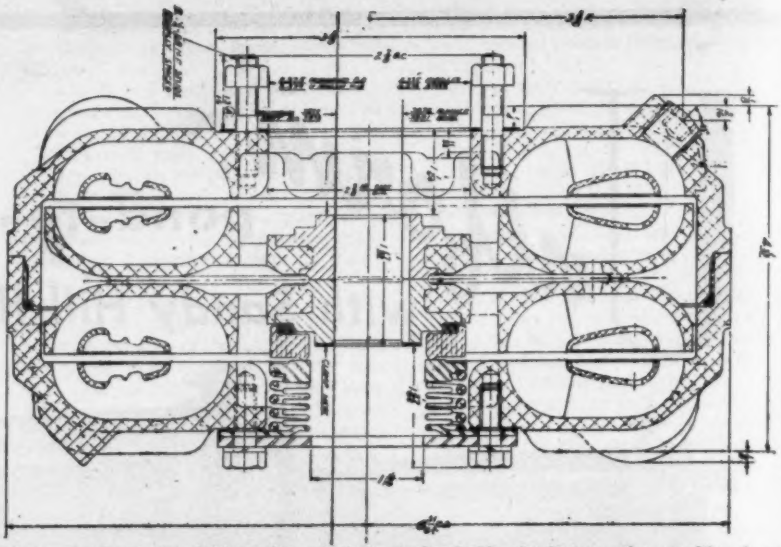
Motor torque varies as the square of the voltage.

The motor and coupling are mounted as an integral unit, thus eliminating the base plates assures accurate and enduring alignment, plus compactness and economy.

When used with a mechanical variable speed device, the effect is similar to that obtained from a variable speed hydraulic coupling. However, the speed is more positive, regulation is infinite and the overall efficiency is higher.

Large size fluid couplings adapt themselves more readily as independently mounted units, rather than integrally mounted. This method of design usually applies to 25 horsepower and over.

It is adapted to alternating current as well as direct current shunt wound motors, preferably 1750 rpm, which have characteristics similar to the standard general purpose squirrel cage motor.



Cross section of the fluid coupling which is of the double circuit type, thus resulting in a compact unit. The runners and impellers are clearly indicated, as are the bellows type, or syphon seals which compensate for any undue expansion of oil

It is strictly of a constant speed nature. However, it can be used where the source is variable such as slip ring a-c motors or adjustable speed d-c motors with a ratio of 2:1 (1800 to 900 rpm). Due to torque speed characteristics of the fluid coupling, a coupling having the torque rating at the lower speed must be used to provide sufficient torque at the lower speeds.

The fluid coupling changes the characteristics of the various motors. The standard squirrel cage type usually provides low starting torque with high pull out torque. Where the starting torque usually is 160 per cent and the pull out torque in excess of 200 per cent, the characteristics of coupling will make use of the motor torque up to maximum in starting the driven equipment. Thus, when using the combined unit, motor and fluid coupling, the motor characteristics of a standard squirrel cage motor changes to the extent of becoming a high starting torque motor. This combination can very readily be substituted for a high torque, high slip, motor, where high inertia loads are encountered or where frequent heavy loads are ironed out by means of flywheels." In this case, the coupling, rather than the motor, provides the necessary slip.

The high torque, high slip, motor, when used with a fluid coupling, again changes the motor characteristics, the high starting torque at zero speed becomes useless, and the maximum torque becomes a lower value than when using a standard squirrel cage motor. The lower stalled torque value of the coupling is due to the rapidly decreasing speed of the motor which has its influence on the coupling which decreases in torque as the square of the speed. In summing up the situation, the fluid coupling changes the characteristics of a normal starting torque, normal starting current to a low starting current high starting torque motor. Similarly, the high torque, high slip motor changes its characteristics to low torque, high slip and low starting current. When the fluid coupling is used with the latter type of motor, the driven equipment can be designed for a lower factor of safety, due to the fact that under stalled conditions the maximum torque imparted to the driven equipment is considerably lower than that of a standard squirrel cage motor. When regulation is required, such as the bridge traverse of a crane, considerable improve-

— because over 80% of all chemical pulp made on this continent is processed at some stage of its manufacture in equipment built or lined by STEBBINS.

Most important, each job is done under a lump-sum contract, providing one responsibility for satisfactory service.

As the pulp and paper industry passes from a buyers to a sellers market — remember "SEMCO" quality is real economy.

Be natural, consult STEBBINS on your next lining or tile tank job.

Stebbins Engineering and Manufacturing Company
EASTERN BOULEVARD, WATERTOWN, NEW YORK

FREE AIR?

NOT ON YOUR LIFE!!

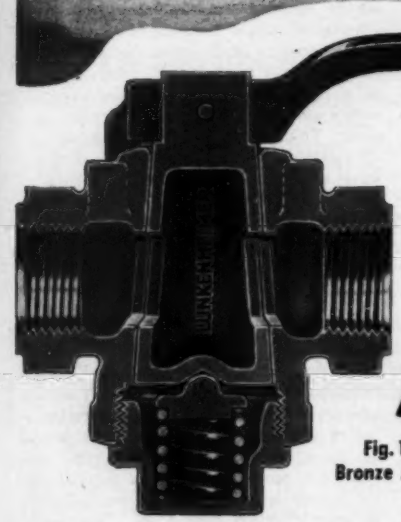


Fig. 1571
Bronze Air Cock

COMPRESSED AIR
is a Valuable Tool . . .
but costly if wasted!

SAVE IT with
LUNKENHEIMER Air Devices

That h-i-s-s-s-s-s you may hear around your air lines means there's a villain loose in your plant. Costly compressed air is escaping, costing you money by the minute. But, you say . . . "it's only a pinhole, can't amount to much." Look at the chart below.

A SMALL LEAK MAY COST YOU AS MUCH AS $5.82 A MONTH.

AREA OF LEAK	AIR	
Diameter Inches	Number of cubic feet per month at 75 lb. pressure	Total cost of waste per month 11c per 1000 cubic feet
1/4"	3,366,990	$ 370.37
1/8"	824,570	$ 90.70
1/16"	213,000	$ 23.43
1/32"	52,910	$ 5.82

Check your plant . . . compressed air leaks mean that good dollars are "gone with the wind." Replace leaky or defective air devices with LUNKENHEIMER Air Cocks, Valves, Nozzles. Designed for air line service, LUNKENHEIMER Air Devices seat tight and stay tight, requiring minimum maintenance for long, efficient service life.

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Stop those air leaks now. Your Lunkenheimer Distributor has a stock of Cocks, Globe and Angle Valves, Nozzles, Safety Valves, Check Valves, Tips, Nipples and other fittings for your needs. *Write for Circular No. 587 and enlarged copy of air leak chart, suitable for posting.*

Fig. 1840
Air Nozzle
Available with
various tips.

Fig. 1227
Pop Safety Valve
for Air

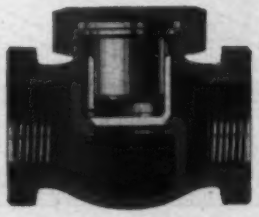
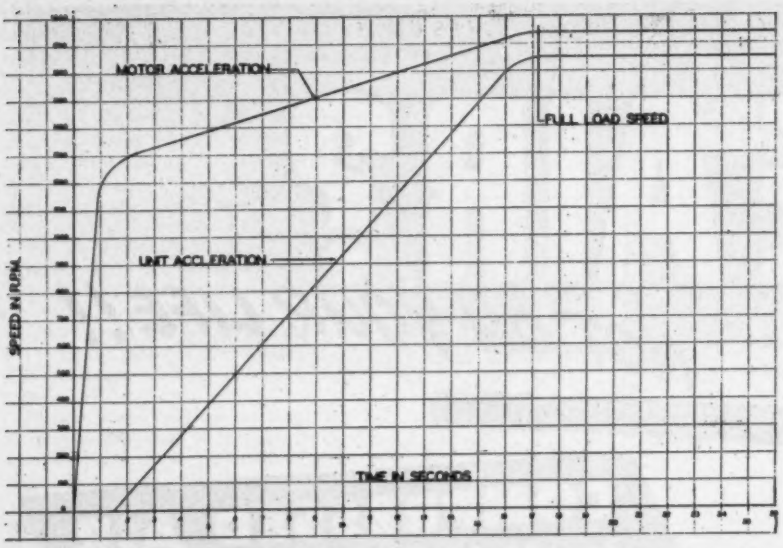


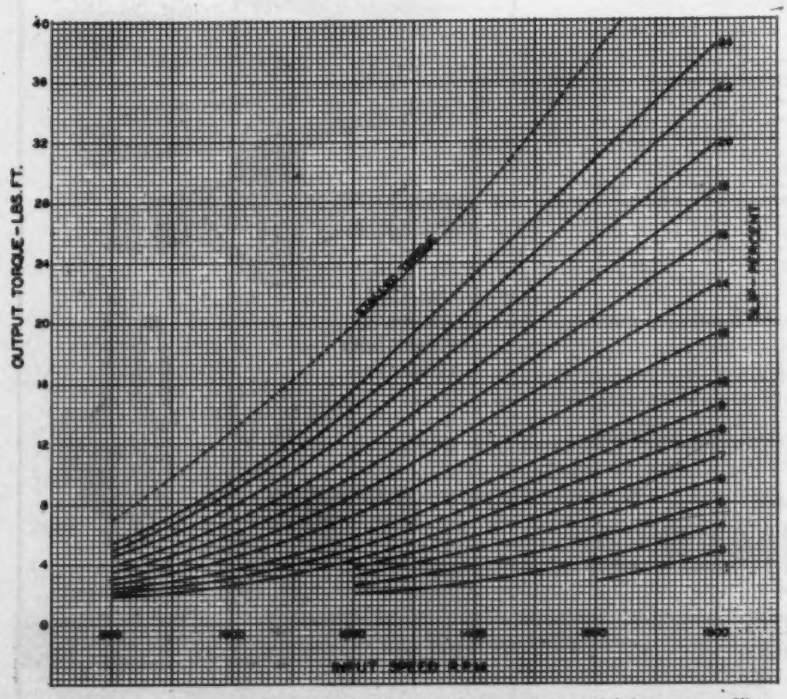
Fig. 1616
Air Compressor
Check Valve...
Hollow Stainless
Steel Disc



A typical acceleration curve combining both motor and coupling curves. Motor starts first and accelerates to approximately 70 per cent full load speed. Coupling starts to accelerate at this given motor speed. Motor and coupling accelerate uniformly, the time element depending on the inertia load. Since the fluid coupling develops torque as the square of the speed, the coupling starts acceleration anywhere up to 70 per cent of motor speed, depending on torque requirements of the driven load

ment can be secured over the conventional method of using a wound rotor slip ring a-c motor or a compound or series wound d-c motor (regulation in the ratio of 2:1), by using a high torque, high slip motor or a shunt wound d-c motor. The fluid coupling, when used for regulation, must be selected on the basis of developing sufficient torque on the lower speeds as in the case where the top speed is 1800 rpm, no load, the torque should be selected as of 900 rpm.

In the case of the integral unit it can be used for vertical operation. It will support its own weight including the rotor and coupling. Any additional downward thrust must be supported independently. Herringbone gears, V-belts, flat belts and chain drives usually require no additional support. Single helical gears, depending on rotation, can cause additional thrust, upward or downward, therefore, must be supported independently. Any shaft extensions must be also supported.



Various speed and torque curves of a 7.4 in. double circuit coupling rated 2 horsepower. Slip or difference in input output speeds is indicated by the various torque requirements

The use of an Electrofluid Drive or fluid coupling used in combination with an electric motor does away with shear pin protection which at its best is erratic and permits abuses in using substitutes for the shear pins, usually resulting disastrously. Protection usually is in the form of thermal overload relays, but can also be provided to trip on definite values where such protection is deemed vital to the protection of the machinery. In the former, the thermal units (heater elements) operate on a thermal basis. Should the driven machinery become stalled or slowed down due to heavy overloaded conditions, the motor speed is also reduced to the point where maximum or near maximum torque is developed; resulting in excessive current being consumed. This excess current heats the heater elements and the opening of the motor circuit through the tripping of the protective relays is based on a time element which varies approximately between fifteen and twenty-five seconds. This time is based on the motor under stalled coupling conditions drawing three and one-half times full load current. The starting and protective equipment is perfectly standard, being on the across-the-line type of magnetic switch providing overload and under-voltage protection. It is the simplest form of equipment that can be used for remote control. The pre-set type of overload protection where the maximum torque, such as 150-200 or 250 per cent, to be transmitted can be predetermined, is accomplished by means of a pre-set instantaneous trip overload relay. This relay is out of circuit during the acceleration period during which time the thermal relay provides the protection. Where thermal elements provide the protection, overload peaks of short duration may occur. The motor through the fluid coupling absorbs these peaks until operation returns to normal.

The motor can be actually reversed from full speed forward to full speed reverse, by the mere pressing of the respective buttons. The action is such as to apply maximum reverse torque to the fluid coupling until the driven equipment actually rotates in the reverse direction. Quick, accurate stopping can be effected by means of a plugging switch mounted on the driven shaft. This switch works on the centrifugal principle, throwing reverse current into the motor until the driven equipment stops. Just before the driven equipment stops, the plugging switch opens the entire motor circuit. At this point, a solenoid brake can be applied, should it be necessary to hold the load. By the use of this method, the Electrofluid Drive provides smooth deceleration and final stopping both by the quick stopping and the reversal method.

Maintenance is reduced practically to zero. The main item being an occasional inspection of the oil level to insure maximum efficiency and protection.

Since motors can be closely rated to meet required capacities, the power factor will be the maximum of the motor. It is well known that the power factor is low on a motor which develops only partial load. A fully loaded motor develops maximum power factor. This can become an important item, as most public utilities penalize their customers in direct relation to the existing power factor on their system up to pre-

HOW you and your employees can reduce this inflationary gap

With proper guidance from top management, the nation's workers can powerfully attack inflation at its source.

One way, of course, is by increasing production. But production of most goods already has been pushed to maximum! The other approach is to reduce the volume of dollars that can be used to bid up prices on scarce goods.

There's no more effective tool for this job than the Payroll Savings Plan for the regular purchase of U. S. Security Bonds. Via this plan, 5.5 million wage earners are investing over 8% of their pay—over 100 million dollars per month—in Bonds.

What Is the Status of the Plan in Your Company?

In companies where top management backs the Plan, 35% to 50% of the employees participate, and the average total Bondholding is $1200 per family. If these figures are above those for your employees, it is apparent that the Plan needs reinvigoration by your personal sponsorship.

Benefits Accrue to the Nation and to Your Company

Every Bond dollar that is built up in the Treasury is used to retire a dollar of the national debt that is potentially inflationary. Every Bond held means fewer dollars to go to market to bid up prices on scarce goods. In addition, dollars invested in Bonds are building future purchasing power. All these factors contribute to the security of the national economy—including your business.

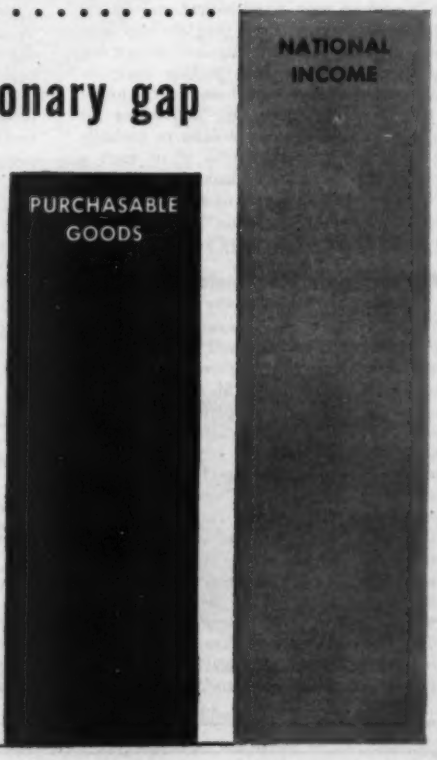
Bonds build security for individuals, because every $3 invested pay $4 at maturity.

Moreover, in 19,000 companies operating the Payroll Savings Plan, employees have proved to be more contented. Worker production has increased, absenteeism has decreased—even accidents have been fewer!

Management's Role Is Vital

Even with all its benefits, the Payroll Savings Plan requires sponsorship by top management to keep employees *aware* of the benefits. That's why the Treasury Department has prepared a kit of materials especially for you to distribute among specific key personnel. Be sure to get and use your kit—for the security of your company and your country!

For any help you want, call on your Treasury Department's State Director, Savings Bonds Division.



The Treasury Department acknowledges with appreciation the publication of this message by

THE PAPER INDUSTRY and PAPER WORLD

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scribed requirements which usually is 90 per cent. As previously mentioned, the Electrofluid Drive permits the motor to utilize its maximum torque. Therefore, in most cases, regardless of the inertia, motors can be selected for the running load.

The initial start of the motor is so rapid as to nullify the current peak since the momentary locked rotor condition is negligible. This is due to the fact that the motor accelerates rapidly up to approximately 70 per cent full load speed before it exerts sufficient torque to accelerate the driven machine. At this speed, the current approximates three times full load current as compared with the usual starting peaks of six times full load running current.

Belt Conveyors (Single Motor Operated)

The motor is selected in the usual manner based on total belt pull, plus terminal and frictional losses. During the acceleration period, the motor accelerates rapidly up to the point where sufficient torque is developed to start rotation of the driving equipment. This may be up to and including maximum running torque of the motor. In the meantime, the driving mechanism and belt have been placed in tension before rotation begins thus eliminating impacts and reducing the actual initial impact on the belt thus tending to reduce accelerating forces. Should the belt conveyor be of an overhauling nature, again the conventional method is followed. The fluid coupling will operate with equal torque and slip in either direction. In this case, the slip is in the opposite direction in less proportion when retarding as when pulling since the losses tend to reduce the load that the motor must retard or brake. In cases where the conveyor may be stopped fully or partially loaded and the retardation is of such a nature that the material becomes the source of power, the application of a solenoid brake beyond the fluid coupling must be incorporated in the drive.

Belt Conveyors (Dual Motor Driven)

On long or high capacity belt conveyors various methods of supplying the necessary power have been employed such as standard general purpose squirrel cage motors, one each for primary and secondary operation, one with an alternate wound rotor slip ring motor for secondary operation or a synchronous motor for primary operation and a wound rotor slip ring motor for secondary operation. Where the secondary motors are of the slip ring type, a permanent resistor is inserted in the rotor circuit. The sizes of the motors in horsepower rating are determined again as in the single motor driven belt conveyor on the total belt pull for total horsepower. The individual ratings are based on belt tension before and after leaving the primary pulley as well as the secondary pulley and the final tension beyond the secondary pulley is determined by the size of and take-up method. The motors usually vary in ratio of 2.5 to 3:1. The use of the fluid drive on the secondary motor permits the use of two standard general purpose motors, making the most economic and effective drive. The secondary or fluid coupling equipped motor usually is started a few seconds before the primary motor is started. This is accomplished automatically with the use of a timing relay. The advantages of this method of starting are the same as of the single belt drive plus the advantage of starting the large primary motor with reduced starting current. Except where the belt is full loaded the secondary motor with its fluid coupling usually exerts sufficient torque to start rotation of the driving mechanism, thus rotating the idling primary motor. Therefore, when current is applied to the primary motor, it is not of a locked rotor nature.

Skip Hoists—Single and Two Speeds (Ratio 2:1)—Single, Balanced and Counterweighted

Skip hoists are used where materials are elevated to heights beyond where other methods such as bucket and belt elevators become uneconomic and inefficient. They can handle a wide variety of materials, such as materials to blast furnaces, crushed stone, lime stone to lime kilns, coal in boiler plants and coke in the manufacture of gas.

In figuring the size and type of motor, the usual methods are followed. Alternating current motors of the two speed squirrel cage type, fluid coupling equipped to adapt themselves very well to hoisting speeds up to 300 rpm with the slow down speed 150 fpm. The shock or impact that usually is partially absorbed by a resistor during motor speed changes is absorbed by the fluid coupling.

The installation of an Electrofluid Drive or fluid coupling, on any power driven machinery, where frequent overloads and jams are encountered, becomes a valuable asset. It insures long life and reduces maintenance to a minimum, primarily due to the elimination of impacts. This is especially true in the papermaking industry, where the various pieces of machinery and methods involved are subject to tension, expansion, contraction, and impacts caused by jams or stoppage of the machinery.

The Application of Felts to Board Machines

L. H. WOODSIDE
Albany Felt Company

Every problem which you have with the behavior of felts on board machines has a reasonable explanation. There are almost always changes that can be made in the construction of a felt which will overcome a particular problem on your machine. These changes should enable you to wholly or partly eliminate the problem. It is the job of the felt maker to help you determine what changes in the felt or the machine should be made. Whether you are going to a new product or are in need of making your present products more efficiently, you should consult your felt maker.

Many of us claim that felt manufacture is more an art and less a science than even papermaking. Yet, by constant study, we are controlling the variables and charting the results so that we can more easily and more quickly arrive at the correct answer to any particular problem. The felt companies are making every effort to eliminate the guess work from felt application, and I think it safe to say that there has been tremendous progress made, particularly during the last ten years, in doing just this.

It is true that every board machine presents a different problem. It is the job of the felt maker, by co-operating with the superintendent and his operators, to best determine the requirements of any machine and to fit the felt to those requirements. This co-operation is probably the greatest reason for the improvement in the results obtained, and it is good to be able to say that the results are continuing to improve.

Let us assume that you are using a particular felt which is giving satisfactory results. Then, as a result of increased competition or the desire of the front office and customer requests, it is decided that you want better finish. In order to obtain better finish, it is usually necessary to make a felt with less stretch, or a felt which is closer than the present felt.

In order to improve this finish on bottom felts, for instance, it is necessary to go to a smaller warp yarn which is weaker in its resistance to stretch. If there is not sufficient margin of safety in the warp strength, then the mill is very liable to run into trouble with stretching of the felt and possible breaking of the warp yarns.

I have talked about a "margin of safety" in the manufacture of a felt. Let me illustrate what I mean. Every board machine in the country has inherent variations. These variations may be in speed, grades, weighting, or any number of other ways. We endeavor to make successive felts for a particular position as nearly alike as possible, but we do not claim that we always achieve exact duplication. We have minor variations in our product, much as you do, but which we try to hold to a minimum just as you do.

Realizing that there are variations in both the felt mill and the board mill, it is easier to arrive at an answer to your problem. Many of you have, no doubt, had a series of felts from one manufacturer of which five out of six would do a good job, and the

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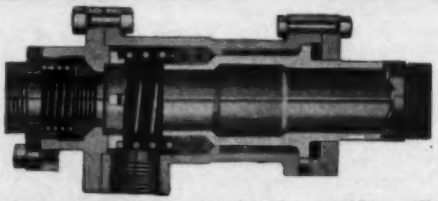

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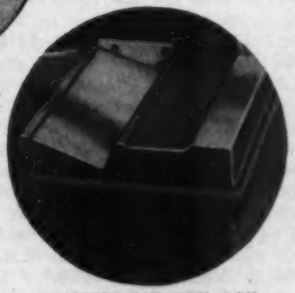

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other one would be terrible so that your results were poor. This can be illustrated by assuming that your variations of operation range between, let us say, 95-115 on a graph. Let us assume that the variations on strength—openness—finish of the felt vary between 80 and 100 on the same graph. If your variations run between 110 and 115, you will have no trouble, but if your variations go to the low side, say at 95, and ours are on the high side, let us say 100, then the Lord only knows what might happen. The felt might act close, it might stretch, or it might just wear out earlier than usual.

It might be well to explain the attitude of the felt company making felts regularly for a paper mill. After the felt maker has arrived at a satisfactory felt as regards size, openness, finess and strength, every effort is extended to maintain a uniform felt. Those of you who have visited a felt mill know that each process in that mill is aimed at making uniform felts, whether it be yarn making, weaving or finishing. No doubt, all felt mills keep records on each operation, and every felt is patterned after a previous felt which was satisfactory. Most felt mills, I believe, finish their top and bottom felts to a certain tension figure. Similarly, there are standards for porosity.

The point I wish to make is that after a satisfactory design has been arrived at, unless there is a machine change or an important change in the finish, every felt should be very uniform in size and performance, if the margin of safety is sufficient.

This brings us to the thought of maintenance. There is probably no other one thing more important to the operation of board machine felts than proper maintenance of the paper machine. I had one case some time ago, where a felt was giving trouble because of "hard" or filled up spots. It was found that the primary presses were badly in need of grinding. After these rolls were put in shape, there was no more filling up of the felt. In this case, we had made a felt just as open as we dared, without affecting the strength or finish and, unless that mill were to have continual trouble with life or with inferior finish, it was necessary to improve the machine.

Many board mills are placing more emphasis on high average daily production than on felt cost per ton of product. That is, the over-all operating efficiency of the machine is considered of first importance. Appreciating that fast, trouble-free operation results in greater profits, they never nurse a felt for a few days' longer life, but cut it off as soon as it begins to lose efficiency. Many mills set as their objective, for example, two weeks' life for a bottom felt and remove it at the weekly shutdown even if it appears to have two or three more days' life in it. By doing this, over-all operating efficiency and production is improved even though felt cost per ton is slightly higher. I know of one mill which increased production 20 tons per day with a higher felt cost of about 30 cents per ton—a very profitable improvement for the mill. With the high labor and overhead rates in effect now resulting in charges often times exceeding $100 per hour, everything possible is being done to prevent shutdowns for felt changes, washups, or trouble of any kind.

May I now outline a theory on the proper cleaning of a felt by showers and a whipper. From my experience, this method is very effective; it surely has made the difference between cleaning a felt and not cleaning it.

The first shower should be directed at right angles to the inside of the felt just before the whipper. This shower must have sufficient pressure to penetrate through the felt and force the dirt out towards the side from which it entered, leaving it on the surface where the whipper can get to it. The whipper then will knock off much of the dirt and loosen up more of it. The following shower on the outside, or face, of the felt should be directed at an angle of roughly 45 deg. towards the whipper. It acts merely as a surface shearing or flushing shower.

These showers should be of the fish-tail type of spray, as a straight jet shower, if not oscillated, might soon cut the felt off. In my opinion, a mill should plan on a pressure of not less than fifty pounds, while it would be better to have even higher pressures available, to be used in an emergency.

Of course, it is possible to get too high a pressure on showers. With too much pressure, the felt is held too firmly against the whipper, so the felt cannot absorb the whipping, and undue frictional wear results.

Another point which might be controversial is the tension under which a felt

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should be run. Some superintendents feel that a felt should be run tightly. Purely from a felt standpoint, this is not true. Nor do I agree with that idea from a papermaking standpoint. I think all felt makers will feel that any felt should be run as slack as it can be successfully operated.

The reasons for this tie in quite closely with the ideas of the amount of over-all stretch in a felt. I have often been asked what is considered as ideal stretch for a bottom felt.

The over-all stretch must be tied in with the running length of the felt as compared to the manufactured length of that felt. As felt makers, we do not like to have a felt which has a maximum running length any longer than the manufactured length of that felt. Suppose a felt made 150 feet long is running at a maximum length of 148 feet, and has six feet of over-all stretch. In my opinion, this felt is running much more safely than another felt of the same manufactured length, which has only a two-foot stretch, but with the maximum length of 152 feet.

In the first case, the felt is running at a good length, and is being allowed to "come back" during each revolution of the machine. In the second case, the felt is either not strong enough, or it is being run so tightly that it cannot shrink back after the press. In other words, the second felt is, in length, approaching the point of damage to warp yarns.

When a felt is run so tightly, the effect of frictional wear from suction boxes, roll slippage or any other source of this wear, is much greater. Further, with a tight felt, any foreign material in the stock or on the machine is much more likely to puncture the felt and cause holes or tears than on a slack felt.

There is a practice on the part of machine tenders, whenever they have trouble, to tighten the felt. I agree with the need of this upon occasion. When a felt is giving trouble with closeness, the quickest way to clean it is to tighten it up. After the trouble is cleared up, the felt should again be slacked off to its normal running tension, if possible.

A few machines have tension devices on them by means of which it is possible to control the tension on the bottom felt. These devices are certainly worth while as they allow the felts to be run at proper tension at all times.

There is one other point on which there is much disagreement, which I would like to discuss. That is the question of slippage in a press. I have been told in the past, that if slippage in a press is not over 1 per cent, then it is not dangerous. This is untrue as it depends upon the other conditions of the press whether any slippage is dangerous or not.

If one of the rolls in a press is brass, and if the roll is not perfectly smooth, it is easy to see that the least amount of slippage between this roll and the felt would be damaging. If the brass roll were perfectly smooth, the slippage could possibly be 2 per cent or more without damaging the felts.

There is a further question as to where the slippage occurs. The slippage could occur between the bottom roll and the bottom felt; between the bottom felt and the sheet; between the sheet and the top felt; and between the top felt and the top roll. It is not likely that the slippage occurs between the sheet and the felts, as this would distort the sheet too badly to operate. Also, the contact between the wet sheet and the felt is more positive than between the felt and the rolls, so slippage is more likely to occur between the felt and either the top or bottom roll.

The point at which the slippage will occur is, in my opinion, dependent upon the hardness of the rolls. For instance, the driving power of a soft roll against a felt is more positive than that of a hard roll. A rubber roll will slip less than a brass roll.

If there is slippage in any press, it is logical to assume that it is between the harder roll of the press and its felt, regardless of whether that roll is a top or bottom roll. It would, therefore, be proper to investigate the bearings and journals on the harder roll first when a slippage condition appears.

I would like to make some suggestions from a felt maker's standpoint to those who are building, or contemplate building, new machines.

First, I would suggest that you allow enough take-up in length to take care of any variation in felt length. Machines of the present and future are being built with larger felt sizes than have ever been used before. With the variation between felts from different makers, it is not possible to use the old standards for felt sizes.

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It is doubtful if a felt 200 feet long can be controlled in length so that it would fit into the take-up of a five foot jack.

About the best yardstick is to figure your minimum take-up at 10 per cent of the length of the felt, with nothing shorter than a three-foot jack, or six feet of take-up. If there are two six-foot jacks on the long felts, and no less than a three or four-foot jack on the shortest felts, there should be no trouble either installing a felt, or in controlling the length within the jack limits.

Further, with a new machine, the felt makers would appreciate, when ordering felts, that you give them the maximum and minimum length of felts and allow them to determine the proper length to make the felt.

Secondly, we would suggest that you allow at least six inches between the ends of rolls and the frame. This will allow for the excessive width that is natural for a felt to assume, when first shrunk on the machine.

Thirdly, we would suggest that you allow enough width of felt rolls, so that the edges of the felts will not lap over the edges of the rolls during operation. There is some question as to how much damage running of felts over the edge of rolls does, but it is certain that the felts will have less wear if they run flat.

There are always discussions on board machine drives. In my opinion, it is not necessary to drive each unit. It has been found on some of the newer machines that it has been necessary to remove the drive from one or more units in order to create enough pull to make the felts operate properly.

If the cylinders and their collars are kept in good condition, it should not be necessary to drive each cylinder. On an eight cylinder machine, a drive on the second, fifth and eighth cylinder should be sufficient. This would allow the felt to stretch normally, which helps it to keep clean.

The Crown Willamette Paper School

A. G. NATWICK*

In the paper industry or any other industry, it is possible to engineer and build the finest kind of plant in which is installed the most modern machinery and equipment and which may be supplied with the best of materials. Yet, if the human factor is neglected, we will not have an efficient and satisfactory operation.

Most industries clearly recognize the importance of employee training, and the paper industry has shown increasing interest in the education and training of its employees in recent years.

The Crown Willamette Paper Company, at Camas, Washington, which later became an operating unit of the Crown Zellerbach Corporation, started its educational project 15 years ago. In a plant, such as the Camas Mill, employing upwards of 2,200 people and manufacturing an extensive range of specialty papers, using its own production of groundwood, bleached and unbleached sulphite pulp, bleached and unbleached sulphate pulp, it seemed desirable to enter into some sort of an educational program in an attempt to give the employees more knowledge of the complicated and wide-spread operations.

It is probably fortunate that we started training our employees when we did as we are just completing a large expansion program, placing us in a position where we are now able to produce greater tonnages of sulphate pulp—much of which is bleached in a new multi-stage plant—and enabling us to manufacture a more extensive line of specialty papers. The addition of new high-speed paper machines has substantially increased our productive capacity of papers. In addition, we are converting large quantities of paper into bags, toilet tissues, napkins, towels and facial products. All of which makes it increasingly necessary to have highly trained personnel able to take over the new and involved operations.

In developing this educational program, there was general information on papermaking available, but so much of our operation was not covered by literature that it seemed necessary to us to present information regarding the operation of this particular plant. The school, therefore, became a pioneering effort.

It was first thought that departmental supervisors should select a certain number of employees from each department, so that a class not to exceed 40 members would start with what was originally intended to be a 24 week course. We found that instead of the supervisors selecting 40 people from their departments, a total of 190 had applied for attendance to the proposed school. We perhaps then made the decision which is the primary reason for the success of the school; and that decision was to make the course available to anyone in the Crown Zellerbach Corporation who wished to take advantage of the opportunity for further education, not to restrict it to those who might be selected by the foremen or supervisors.

Another important feature was the selection of the supervisors from our plant, as well as capable operators from other plants, to lecture on subjects covering the whole operation in general; from wood, manufacture of pulp and paper, converting, and on through management problems.

We felt that this one year of educational effort would take care of the situation for a few years, at least until another group of students evinced some desire to learn more about the industry than would be possible by working in one department of the plant. However, the following year a great number of requests for continuation of the paper school course came to us by those who had completed the first year. Thus, subsequent terms were begun each year and a four-year course was eventually evolved which allows the student who completes it to be so well informed in his better knowledge of the phases of pulp and paper manufacture as to command particular consideration when selection of men for promotion to greater responsibility is in order.

Through the presentation of lectures by foremen and supervisors to the students, we have developed a very valuable relationship not generally found in organization and conduct of paper schools, which is perhaps one of the important factors of the program. The superintendents and foremen of the

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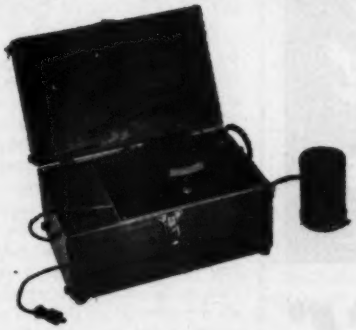

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Camas mill, who do most of the lecturing to the paper school classes, have become increasingly proficient in their presentation of the subject matter. A transcript of these lectures has been compiled into a textbook entitled "Making Paper."

Perhaps a degree of the success of the paper school may be attributed to the liberal policy adopted early by management in respect to its financial outlay annually for its conduct and maintenance. No charge whatever is made to the student; he is provided at the beginning of the course with a copy of the textbook, which is required to be returned at the end of the school year. However, if a student should care to buy one of these books, it is available.

The student has access to all of the pulp and paper literature in the city and mill libraries; besides this, a large range of material is provided for his further reference. We consider that the instruction by those with long years of operating experience is particularly valuable, as these practical men know a great deal about pulp and paper but usually publish nothing.

A few hours of instruction in the fundamentals and intricacies of paper machine operation made clear by a pulp or paper mill superintendent, for instance, whose record of service is over many years and whose responsibilities have grown in those years, can hardly be compared with a method which sought to present the same material from a textbook.

Instruction by illustration, a fundamental principle of teaching, is stressed. At each lecture where such are applicable, exhibits are set out for the lecturer's use. Photographs, drawings, tables of data, and microscopic slides are provided and made use of by practically every lecturer. This material is carefully filed and continually added to, thereby making available more complete data from year to year. In further extension of instruction by illustration, the paper school has provided itself with a set of colored motion pictures showing the complete papermaking operation of the Camas plant from log rafts to the converted product. These motion pictures have added much to the interest and instruction for the entire course.

The first-year class is shown the motion pictures along with the lectures for the purpose of giving them a general idea of the complete mill operations. To the second-year class, definite and specific details of the Camas operations are shown and studied by means of the motion pictures. The third and fourth-year classes do not use the pictures except to clarify some point in discussion. Several excellent industrial films are made available each year which are either directly or indirectly connected with the paper industry.

At a weekly lecture of one and one-half hours in the first-year class, it is intended to present only the elementary and broad picture of fundamentals of chemistry, physics, electricity, wood (its preparation for pulp making), steam, the principles of the chief pulping processes, the place of water in pulp and papermaking, the screening and bleaching of pulp and its preparation as furnish for the paper machine, the paper machine operation, paper finishing, paper converting, and purchasing and mill management. No attempt is made in the first year to specialize. Lectures are prepared and delivered by mill superintendents and foremen, each in his turn.

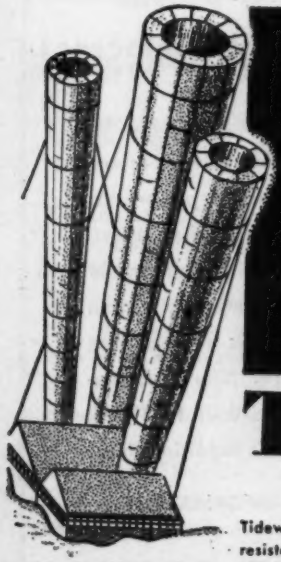
The course of study for the second year directs close, almost exclusive attention, toward studying wood preparation, pulp processing and papermaking, specifically as carried on at the Camas mill without particular reference to pulp and papermaking as conducted by other mills or other principles not in use at Camas. The enlarged features of the second-year course which provide this emphasis are the moving pictures and mill visits. The second-year students attend a weekly lecture of one and one-half hours and are also required to spend an equal weekly period in the mill in observation of that particular operation which has been covered in the previous lecture. Mill visits are made in groups under the guidance of a competent employee-instructor and at periods compatible with the employee's requirements of tour work.

Beginning with matriculation in the third year the student comes to depend largely on his own initiative and effort. Seven formal lectures are given, practically all of them by outside speakers. Those on process and equipment are presented usually by manufacturing representatives in allied industries who are authorities on the topics they discuss. Other lecturers in the third year are those who are competent to discuss their subjects, such as officers from the unions and those who are employed in guiding human and labor relations in industry. Subjects covered are:

Industrial Financial Reports; Wage Economics of the Paper Industry; Our Place in the Fruit and Vegetable Packing Industry; Growing and Use of Second Growth Timber in Pulp Manufacture; Metals, Alloys and Their Structures; Conveying Materials.

Each student is required to spend four hours a week—a total of 64 hours—in mill study allocated 16 hours each to the wood mill, sulphate mill, sulphite mill, and beater operations in regular progression. Four evenings are devoted to general open discussion of problems in these departments, the supervisor of the department in question taking the chair. The mill studies required of this class are on an entirely different basis than the supervised mill visits of the second-year class. The student is provided with a pass in his own name which admits him to all departments of the mill for his study at any time day or night. His aim is to apply himself to the particular department being studied as though he were preparing to become a responsible operating foreman. To be sure, this idea is scarcely fully realized except in the case of the more competent individuals; yet it is surprising how well the student trains himself in the knowledge of wood preparation and pulp manufacture and develops in his powers of observation and interpretation.

The fourth year is entirely similar to the organization of the third year. The third-year graduate continues his independent line of study as applied, now, however, to phases of: (1) types and operation of paper machines, jordaning and pumps; (2) finishing and converting of paper and ship-



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ping; (3) steam, electrical and mechanical departments; and (4) a phase most important for his knowledge, namely, what constitutes the quality of paper products in respect to the particular trade the mill serves and the importance of quality maintenance. This requires an understanding of the whole subject of technical control. As in the case of the third year, outside speakers are invited to speak on subjects disassociated with the industry, but different from those discussed in the previous year, such as:

Evaporation; Principles of Hydraulics, Pumps and Pumping; Vacuum Filters; Manufacture of Alcohol from Waste Sulphite Liquor.

The fourth-year student is also expected to attend lectures on wage economics of the paper industry and industrial financial reports.

Executive supervision and direction of the Crown Willamette paper school policy is exercised through a Board of Regents, comprised of three members: the operating vice president of Crown Zellerbach Corporation, the Camas resident manager, and the West Linn resident manager. The control and direction of curriculum and instruction is, and has been, under the supervision of A. G. Natwick, assistant resident manager, acting as Dean of the school since its inception in 1933. The technical supervisor of the mill acts as principal. The latter appointment is most advantageous to serve the purposes of this school, in that the technical supervisor has naturally at his command a more centralized view of the entire mill operations.

One professor and an assistant professor for each course is appointed by the dean, principal and board of regents. Four advisory faculty board members, who are departmental superintendents, are chosen because of their ability to direct contact to various departments and make themselves available for any information or assistance that is required of them by the school. In addition to this, there are thirty-two mill instructors who lecture to the four classes.

Records of attendance, examinations, mill visits and mill study are kept by an appointed registrar, and the quality of work done by each student throughout his school attendance is watched closely through this office.

Students of the first and second year classes are examined regularly through written examination, which they are permitted to prepare on their own time and with the aid of whatever textbook material or consultation they may choose. In these, the more elementary courses, it is assumed to be the most important to the student's benefit that he has fixed in his mind a well defined picture of pulp and papermaking operations by being required to review the instruction he has received, rather than to embarrass him with the possibility of discouragement by a method of examination whereby he would have to depend entirely on his memory.

Examination of the third and fourth year students is carried on in quite a different manner, it being felt that the students having passed through the two years of elementary study and having fulfilled the requirements of individual mill observation, should be able to write comprehensively on any process or operation without recourse to notes or text.

The liberal policy of the mill management is extended to the graduation exercises at the end of the school year by having as their guests all of the students at a graduation banquet for the purpose of awarding diplomas and special prizes to those who have won recognition by scholastic achievement in their particular course.

The best speakers available in the Pacific Northwest are invited to address the students and, doubtless, the excellent talks that have been given, in the past have been a source of inspiration to many, not only to carry on with their school work, but to more vigorous determination and effort toward bettering themselves for their particular field in the mill and the next progressive step in the line of advancement.

The paper school has become well known throughout the papermaking world, and requests for information have come from the Scandinavian countries, Finland, India, Russia and several of the South American countries.

The first two years of the school are open to women and quite a large number have attended. Secretaries, stenographers and statistical clerks find that this training is of particular value to them in acquiring knowledge of the subjects which they are continually handling in correspondence and in reports.

During the 15 years of its existence, the school has served students ranging in age

from 16 to 72 years, and it has not been unusual for husband and wife, as well as father and son, to attend class together and to study the same subjects.

While the expenditure on this project has been rather large over the period of years in which the school has operated, we find that the cost per student year has not been out of line. This cost at the present time is running about $20 per student year.

Recognition was given the school by the University of Washington and Oregon State College several years ago, based on the contents of the courses, methods of instruction and professional standing of the faculty. Full credit is extended the students for their work in the Crown Willamette Paper School and may be applied in the College of Forestry and Engineering, including chemistry and chemical engineering at the University of Washington, and in the schools of forestry, chemistry, chemical and mechanical engineering at Oregon State College; providing the student meets the scholastic requirements of these institutions.

The outstanding feature of this pioneering industrial educational program is, perhaps, the fact that we have made it possible for a man to enroll in and attend university classes right at the plant in which he is employed.

Application and Maintenance Techniques for Mill Insulation With Specific Reference to 85 Per Cent Magnesia and Diatomaceous Silica

UTLEY W. SMITH, Manager
The Magnesia Insulation Manufacturers Association

Insulation, rightly considered, is as much a part of mill equipment as a digester, cooker or evaporator. Like any other equipment, insulation must be properly installed and adequately maintained, if it is to operate efficiently and economically.

The techniques used in applying and finishing the insulation and the problems that arise in maintaining it are largely determined by the properties of the materials used and the operating conditions involved.

Although insulation thickness specifications would be more properly considered under equipment design rather than maintenance, nevertheless an understanding of the factors involved in such specifications is important to an adequate insulation program.

Insulation is used for a variety of reasons in the mill, among them being temperature control, heat conservation, worker protection and worker comfort.

Since the primary function of the insulation is heat conservation, the question as to the thickness to be used is one of economics. For many years, insulation thickness was based upon a fairly routine consideration of pipe size, equipment dimensions and operating temperatures. Today, however, the greatly increased cost of heat generation makes a more precise determination of thickness highly desirable. The most economical thickness of insulation is that at which the sum of the annual cost of insulation and of the annual cost of the heat loss is at a minimum. Among the variables involved are hours of operation, operating temperatures, rate of amortization, cost of heat production—which is based on fuel, labor, equipment and maintenance cost—as well as cost of insulation.

When temperature control is necessary, or when it is desired to keep workroom temperatures within comfortable limits, insulation thicker than the economical thickness may be necessary. On insulated outdoor equipment, about ½ in. is added to the economical insulation thickness specifications since heat losses rise sharply with air velocity. Also, there is greater variation in ambient air temperatures as compared with indoor installation, which makes temperature control more difficult.

The oldest of modern insulating materials, 85 per cent magnesia, is used extensively on piping and equipment operating at temperatures up to about 600 Fahr. As the name implies, the material is composed chiefly of magnesium carbonate. Asbestos fiber is added to give it the necessary reinforcing and binding qualities so that it can be molded. Its low heat conductivity is due to a low density structure composed of minute dead air cells formed by the interlocking crystals of magnesium carbonate. 85 per cent magnesia is available in the familiar forms of semi-cylindrical and segmental pipe sections, curved and flat blocks, and as cement.

Most mill operators are acquainted with 85 per cent magnesia as past operating temperatures have been largely under 600 Fahr. However, modern mill practice calls for higher temperatures and introduces the problem of insulating for temperatures over 600 Fahr.

Where such temperatures are encountered, a combination insulation is used composed of an inner layer of diatomaceous silica insulation and an outer layer of 85 per cent magnesia. Combination insulation provides the low heat conductivity of the 85 per cent magnesia with the resistance to the effects of high temperatures possessed by the diatomaceous silica. The result is an efficient, long-lasting covering that requires a minimum amount of maintenance.

Diatomaceous silica is a naturally occurring material composed of microscopic fossilized plants called diatoms. Asbestos fiber is added as a binding material, as in the case of 85 per cent magnesia. Diatomaceous silica insulation is available in the same forms, sections, segments and blocks, as 85 per cent magnesia, and it is dimensioned so that it will fit properly into the outer section of 85 per cent magnesia. As with 85 per cent magnesia, diatomaceous silica cement, or high temperature insulating cement, as it is sometimes called, is simply the molded product in powdered form.

These materials can be shipped to, and handled and stored at, the mill without excessive breakage, and without taking any special precautions in the process. They can be applied easily and rapidly, with a minimum number of tools. Standard shapes can either be sawed or cut with a knife, without cracking or crumbling, to fit the requirements of odd-shaped equipment or fittings. They have enough "give" so that they fit tightly against the contour of a surface without breaking apart.

Before insulation is applied, pipe and equipment surfaces should be cleaned of scale, grease, dirt or any other debris that might prevent the insulation from fitting snugly. Loose-fitting insulation cannot give maximum protection against heat loss because air convection currents are set up around the equipment surface. Also loose insulation has a tendency to break when subject to expansion and contraction. Tight-fitting insulation is especially important on high temperature equipment, equipment that is alternately heated and cooled, as for instance, a heated batch tank or liquor heater, and equipment that is subject to a great deal of vibration, such as pumps, turbines, etc.

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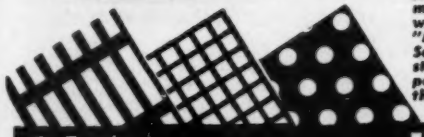

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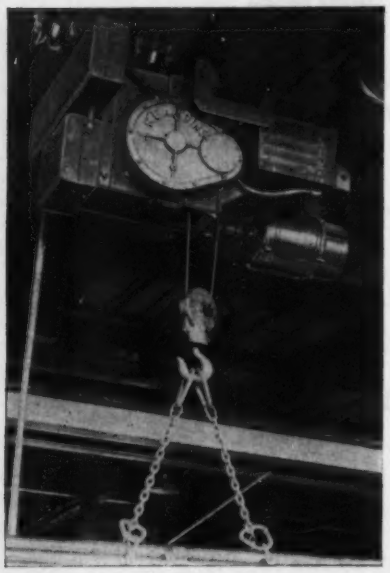

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When insulation is applied on either piping or equipment, the semi-cylindrical sections, segments or blocks are butted tightly together so that heat in the form of hot air cannot escape through the cracks. In order that there may be no continuous joint from the hot surface to the air, joints in the inner and outer layer of combination insulation are staggered with respect to each other. As an added precaution, all joints in a layer are sealed with cement made of the same material as the respetcive layer of insulation.

On pipe bends, insulation is either formed by hand to fit the contour of the pipe, or, if the bend is too sharp, a section of pipe insulation is fitted by mitering. Each mitered piece is wired on separately to prevent it from coming loose.

On piping 3½ in. and smaller, valves, flanges and fittings are insulated entirely with cement. On piping 4 in. and larger, pipe or block insulation is used, whichever is the more suitable. As an aid in insulating such pieces, insulating cement is daubed on first and then the insulation is applied. The cement helps to keep the insulation in place while it is being wired on.

When flanged connections must be unbolted frequently, permanent type insulation is impractical. It takes time to strip off insulation and reapply new material and such a procedure is expensive. However, the answer does not lie in letting the flange go uninsulated. An 8-in. line operating at a temperature of 400 Fahr., for instance, will lose the heat equivalent of more than a ton of coal a day for every bare flanged coupling in the line. Removable insulation solves the problem, for it can be quickly removed and replaced as often as required and without damage.

A template or wire frame of ½-in. galvanized wire mesh is built in two parts, to fit around the flange. Insulation blocks are cut to fit the shape of the frame and are firmly wired to it. Wire mesh is applied over the blocks and wired to the frame to serve as a foundation for the cement finish and also make the cover more rigid. The entire unit is covered with insulating cement, both inside and outside, and, except for the finish, is ready for use.

For vessels, such as tanks, heaters, clarifiers, etc., greater than 5 ft. in diameter, insulation is held in place with galvanized steel or other corrosion-resistant bends instead of the wiring used on piping and smaller equipment.

Insulation around manholes, nozzles, and other openings is beveled off so that bolts can be removed without disturbing the insulation.

On vertical apparatus, more than 30 ft. in height, angle bars or supports are provided to keep the insulation from slipping. The supports are welded in place at the bottom and at 15-ft. intervals for the entire height of the vessel. These supports project horizontally ½ in. less than the thickness of the insulation, and are equipped with holes to provide anchor points for the tie wires. For horizontal tanks or vessels 4 ft. in diameter and larger, similar supports are provided. In this case they are welded along horizontal center lines of cylindrical shells and along both heads of the vessel.

Factory-applied canvas is not heavy enough to protect the insulation on piping inside the mill. Instead, pipe insulation should be finished with an 8-oz. canvas jacket, which may be sewed on or pasted on.

Before the canvas jacket is applied, the insulation is wrapped with a layer of rosin-sized paper. If the canvas is pasted on, the edges are lapped. If the canvas is sewed on, three stitches to the inch are used. The canvas jacket is generally sized and painted with lead-in-oil paint.

Pipe insulation near catwalks, stairways, hoists, mobile equipment or other points where it is subject to mechanical abuse is enclosed in a galvanized sheet iron jacket that effectively protects it from damage.

Before the paper and jacket are applied on pipe bends, the insulation is given a hard coat of asbestos cement so that a smooth even surface is presented for the paper. Similarly insulation on flanges, fittings and valves is covered with a ½-in. thick layer of hard finish asbestos cement, in two coats, before the jacketing is pasted on. The layer of cement is just thick enough to make the insulation equal to that on the adjacent pipe.

The finishing of mill equipment located indoors is a rather simple procedure. Hexagonal wire mesh is applied over the insulation to provide a strong bond between the cement coat and the molded insulation surface. On large diameter equipment the wire mesh is tied to the insulation supports mentioned earlier. A ½-in. thick coat of asbestos cement is applied in two coats. The first coat is keyed through the mesh, scratched and allowed to dry before the second coat is applied. The finish or second coat is troweled on smooth.

Insulation on equipment and piping located outdoors requires protection against the effects of winds, rain, storms, etc., so that its insulating value may be unimpaired.

Pipe, flange, fitting and valve insulation is protected by a 50 to 55 pound asphalt saturated asbestos roofing felt. Generous laps are provided at all edges and sealed with asphaltic lap cement. All longitudinal laps are located on the side of the pipe and turned downward so as to shed moisture. On valves, fittings and flanges too small to cover conveniently with the roofing felt, a weather-resistant plastic asphalt cement is used. The material can be troweled to a smooth hard finish. It is also used to seal any voids, spaces or cracks around pipe hangers, or where the weatherproof finish on the valves, flanges, or fittings borders on the adjacent pipe jacket. In other words, every precaution is taken to make the insulation as weather-resistant as possible.

In some cases, outdoor piping in the mill area runs close to the ground and the insulation is subject to abuse by traffic. In such cases, the weather-proofing can be eliminated and a No. 26 gauge galvanized sheet steel jacket can be used instead.

It should be emphasized that insulation is a valuable piece of plant equipment and deserves the same thorough inspection and maintenance as a recovery boiler or a digester. In some cases, maintenance and repair can be carried out by an insulation contractor. In this way, the mill has at its disposal a staff of engineers and workmen

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with long years of experience in the insulation field. Service arrangements may be made with the contractor to handle maintenance work either by routine, periodic inspection and servicing when needed, or by assignment of permanent crews to the plant, if there is enough work to warrant such an arrangement.

Fire Causes and Protection of Paper Mills

J. P. HAMILTON
Associated Factory Mutual Fire Ins. Co.

The two fundamentals of good fire protection can be briefly stated thus—(1) Prevent as many fires from starting as possible, and (2) Keep those that do start small. These fundamentals apply to the paper mill industry as to all other industry. They can be simply stated and are not too complicated to put in practice either.

The manufacture of paper is essentially a single line process. There is little duplicate machinery in the various processes, making it essential to protect each link in the chain in order to insure continuous production. A cotton mill, for example, can lose a few looms, or a few spinning frames without unduly affecting the processes or the total output. But not so in a paper mill. There are many bottlenecks. From the barking drums, the long conveyor and the chipping machines, to the paper machine itself, there is no stack that can be taken up in the flow of raw stock. The flow of material from start to finish is practically continuous, If there is a breakdown failure or fire loss, and one process fails all others are affected. Thus, it is highly essential to protect these processes from fire losses.

First, let us start at the beginning and look at the principal raw stock in the log yard. Usually, there is one or more log piles or stacks at every mill, and total contents may vary from a few thousand to over two hundred thousand cords in size. The piles may be either stacked or ranked. Ranked piles are much to be preferred to stacked piles from a fire protection standpoint because the former are cleaner, more compact, eliminating air spaces and reducing drafts in the event of fire and we regret that the present trend is away from them.

A deep seated fire once well established in a large stacked log pile is almost impossible to extinguish regardless of the water supplies, and there is little that can be done to save the pile except to remove as many logs as possible while the fire fighters retard the spread of the flames. I might add that the word "retard" brings little cheer or comfort to fire protection engineers. We like to use such words as prevent and extinguish. Fires in pulpwood piles are generally started by quite prosaic causes, such as sparks from stacks, including railroad locomotives, smoking, exposure fires in grass, woods, etc. Since few logs are floated down the river to the mills any more, thereby becoming well saturated with moisture, but are brought mostly by truck and rail, they are relatively dry upon arrival at the log yard, containing at times as little as 23 per cent moisture by weight. This means a greater fire hazard.

Arriving at the mill, the dry logs are usually stacked by conveyor or stacker; increasing the hazard, because the piles assume a thatched roof effect, which shed water rather effectively and permit only a small penetration. Unfortunately, sparks seem to have little difficulty in working their way well down into the interior.

A major factor in fire safety in wood yards is the size of the individual piles. This is of paramount importance in areas where timber cutting is seasonal and wood yards may contain as much as a year's supply. One of the largest pulpwood fires on record occurred in Canada in 1932 at Port Alfred, P. Q., when a single pulpwood mountain of 219,000 cords burned for twelve days in spite of huge quantities of water, reaching a total of nearly 30,000 gpm, some 180,000 cords were consumed and the mill had to shut down. It is believed to have started from a spark blown into the fire, dry wood refuse under a conveyor at the top of a pile.

It behooves us then to limit the sizes of individual piles. Five 20,000 cord piles are considerably safer than one 100,000 cord pile. Some wise man long ago, possibly it was Aesop the slave, mentioned "all the eggs in one basket." Limit piles to 20,000 cords, to width of 200 ft. and height to 95 ft., and maintain a clear space of at least 100 ft. between piles and main buildings.

Keep wood refuse, rotted wood, and

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bark out of the piles. Piles of peeled logs are safer than piles of unbarked log for this reason.

Remove dry grass, brush, and rubbish, and maintain excellent order and neatness throughout the wood yard.

Remove all sheds and combustible buildings unprotected by sprinklers from the area. Make motor houses and conveyors non-combustible and install sprinklers where possible.

Install and maintain spark arrestors on locomotive stacks.

Do not permit use of gasoline or oil burning equipment on or over stacks.

Equip all gasoline or oil burning machinery with water filled or condensing type mufflers, flame arresters on carburetor, air intakes, and see that the sediment bowls, if any, in the fuel lines are of metal. Do all refueling of oil burning equipment and garaging during the idle periods well away from the piles.

Keep moving parts of conveyors well lubricated. Do not run conveyors through steel troughs unless water sprays are operated.

Strictly enforce the "No Smoking" rule.

Provide hourly recorded watchman service at all times, and conveniently located fire alarm boxes or telephones are necessary in larger yards. Wet down piles and surrounding ground once or twice daily during dry weather.

So much for the preventing of wood yard fires. In spite of the best of precautions, fires occasionally start and methods and facilities for combating them must also be provided. To protect these piles requires large quantities of water at good pressure. Ordinary hydrants and hose protection is inadequate. To overcome this, the Factory Mutuals developed the log-pile type of monitor nozzle some twenty-five years ago. This is a special nozzle which gives discharge a stream of greater capacity and range than ordinary underwriter nozzles and because it is swivel-mounted, it can command the area in a wide arc.

Usually these nozzles are located on suitable towers around the perimeters of large log piles, spaced sufficiently close that every portion of the pile is well within range of one or more nozzles.

Portable deluge nozzles are a practical supplement to monitor nozzles and ordinary hose stream. With their two inch tips, and supplied by three or four siamesed hose lines, they can furnish powerful streams which are invaluable for close fire fighting after the surface fires have been extinguished by monitor nozzles.

Adequate water supplies for protection of stacked log piles vary with the size and number of piles. The minimum should be about 1500 to 2000 gpm at 100 to 110 lb. residual pressure, for small piles of about 5000 cords. As the size of the piles increase, additional pumping capacity is needed, until at 20,000 cords, there should be about 5,000 gpm available. For several 20,000 cord piles, 10,000 gpm is not too much. Ranked piles require considerably less water. Piping systems for such supplies should consist of 1, 10 and 12 inch mains and possibly 14 inch supply mains if they are of any appreciable length. Pumps should be located as near as practical to the log yard, and should have a 100 per cent reliable power supply, preferably both electric motor and gasoline engine driven pumps should be available. Power lines should be kept entirely clear of piles, and at sufficient distance that they will be undamaged even by a log pile fire in strong winds.

Suction supplies should be from inexhaustable supplies in river, ponds or canals.

In order to utilize the full value of this expensive fire protective equipment log yard and mill employees should not only be instructed, but should also be well drilled in fire fighting methods. This can be best accomplished by having brigades organized on each shift from key employees.

Most fires start at the surfaces of piles and falling embers carry them downward to the interior, with abundant air spaces between logs in a stacked pile, strong drafts from the outside inward tend to hold the fire in the interior. As the fire reaches the center of the pile it begins to burn slowly towards the sides. The heat causes a strong suction at the base of the fire, and against such a strong updraft a hose stream, unless applied downward with force, cannot reach the seat of combustion, but is partly evaporated while the remainder is carried away by the updraft. Records of fires successfully fought clearly emphasize the following cardinal principles:

1) Prompt discovery and alarm. These are secured by continuous watchman's service and conveniently located call boxes of a fire alarm system or telephones for prompt notification of the fire brigade and public fire department.

2) Immediate application of water. A small amount of water applied at the seat of the fire at the start may be more valuable than a million gallons applied later.

3) Close range work. As soon as flame and smoke conditions permit, hose lines should be laid up on the pile from yard hydrants or from hose connections or stackers and conveyors. Speed is essential to prevent embers from dropping down into the pile beyond reach. Hose streams carried up the piles may be necessary to reach sheltered surfaces at conveyors or beyond peaks.

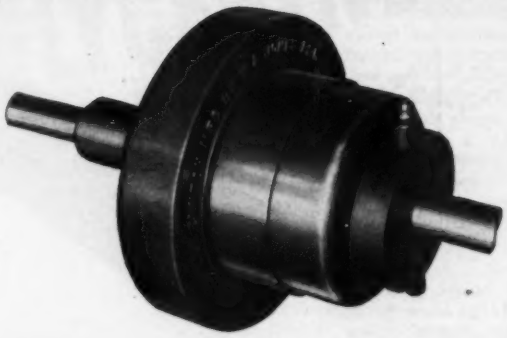
4) Follow the fire down inside the pile. Large hose streams should be thrust down between the logs as soon as surface flames are extinguished and smoke conditions permit. In this way, large quantities of water can be made to penetrate to greater depths. In one case, fire was extinguished after following it down to a depth of 40 ft. Burning logs should be thrown back and the pile torn apart in order to reach the fire.

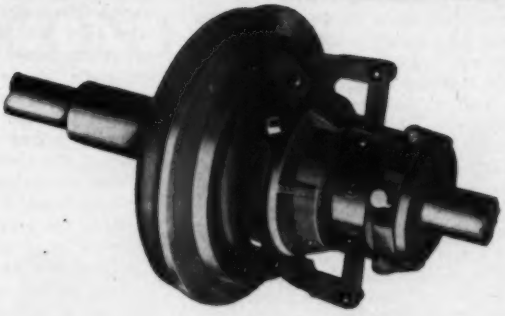
After the fire is apparently out, burned and charred logs should be removed throughout the entire area involved, and water should be applied until no possibility of fire remains.

Well arranged and properly maintained electrical equipment eliminates many fires. And possibly because there is no industry where electricity is not used in some form, electricity remains in top position as the greatest single cause of fires in industrial plants. The subject of power supplies and electrical equipment fills volumes, and we can only touch on it here, but neglect it

(Turn to Page 486)

JONES-LEMLEY FRICTION CLUTCHES





JONES-LEMLEY friction clutches are built for a broad range of shaft sizes and ratings in both enclosed and open types for sleeve and coupling work. In addition they are available in a line of Jones-Lemley friction clutch pulleys. This clutch modification is also used for gears, V-belt sheaves, sprocket wheels, etc. Sizes, ratings, dimensions, prices and other data are contained in Bulletin No. 60. Your request will bring a copy.

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GENERAL MOTORS

NEW EQUIPMENT AND SUPPLIES

New Roll-Handling Truck

A new truck to be known as the *RolTruk* has been added to the line of products put out by Ironbound Box & Lumber Co., 102 Hoffman Place, Hillside, N. J.

The RolTruk was developed specifically to handle rolls of printing paper, wrapping paper, protective coatings, etc., but it will easily lift and carry any cylindrical object such as a drum, barrel, keg, etc. One of the features of the RolTruk is the nonslip arm. Once the arm is locked around the roll, it will not allow the material being handled to roll off until the finger-tip release catch is manually disengaged. This feature prevents accidents to workers and eliminates damage to the product. And the arm is so constructed that it grasps the roll securely without damaging it in any way.

To operate the RolTruk three easy steps are followed: (1) Place RolTruk against roll; (2) Lock arm in place with finger-tip control; (3) Tilt RolTruk back on wheels.

The RolTruk is constructed of formed steel pipe and has a heavy steel cradle. The entire unit is welded for long life.

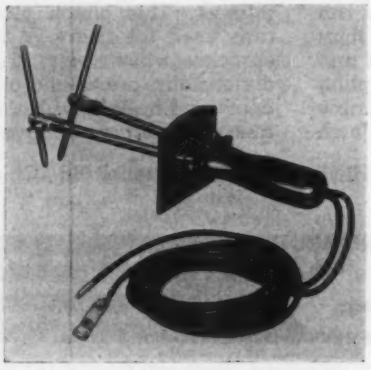
Two models are available: Model RTL for light duty, has a product diameter capacity up to 32 in.; weight of material capacity up to 800 lb. Model RTH for heavy duty has a product diameter capacity up to 40 in.; weight of material capacity up to 1500 lb. Wheel types determine the load capacity. Rubber-tired wheels reduce the capacity to 500 lb. Molded plastic wheels will carry up to 800 lb. and steel wheels permit loads up to 1500 lb.

Carbon Arc Torch

A new low price carbon arc torch for use with a-c welding machines is announced by the Lincoln Electric Co., Cleveland, Ohio. The torch is of rugged yet lightweight construction, designed to extend the use of welding equipment to jobs where the application of heat is desired without melting the metal being worked on.

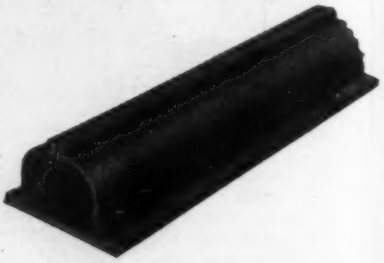
With the arc torch a high temperature flame is produced between two copper coated carbon electrodes clamped in aluminum alloy jaws. Both carbons are readily adjustable, geared to move together so that the angle of the carbons can be kept constant at all times. The handle of the torch is provided with simple thumb control tabs geared so that a slight movement of the thumb adjusts the distance between the carbons. To operate, the carbons are brought together to produce the arc, then the proper flame is automatically obtained by reversing one of the thumb tabs until the gears lock.

The unique carbon holder jaws will hold tightly either a 5/16 in. or ⅜ in. diameter carbon without adapters or special extra jaws. The torch is equipped with two cable leads. One lead has a tip that is clamped to the welder's regular electrode holder, and the other lead has a spring clip that clips to the welder's ground lead. The handle is made of rugged thermal plastic. With an a-c welder the arc torch can be used for all types of brazing and soldering work, general heating, as well as hard surfacing of thin materials. The torch is suitable for both production and maintenance work: for soldering light or heavy copper, tinned or galvanized parts; for preheating small work areas prior to welding; heating and straightening bent work; brazing cast iron, monel metal, aluminum sheet and castings; for fusing the powder type of hard surfacing material to thin metals; for such odd jobs as applying heat to loosen rusted nuts.



Self-Enclosing Belt Conveyor-Elevator

Stephens-Adamson Mfg. Co., Aurora, Ill., has announced a new type of enclosed-belt conveyor-elevator (patented) which utilizes a flat-conveyor type base belt combined with two moulded vulcanized rubber side walls with teeth for locking their top edges to form an inverted U-shaped tube of the base belt and side walls. This conveyor-elevator, designated as the *Zipper*, conveys and elevates in any direction, with the material being handled being entirely enclosed within the belt. (Manufactured for Stephens-Adamson by the B. F. Goodrich Co.). At the discharge point, the belt automatically opens for complete discharge. According to the announcement,

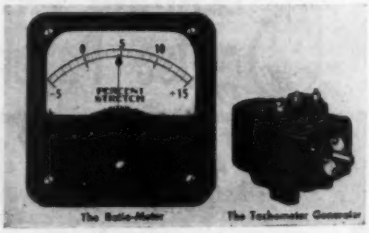


test installations show that the belt will convey dry chemicals, coal, or other small lump materials in solid mass and over long distances, and to considerable heights without spillage, breakage or contamination.

Speed-Ratio Tachometer

To provide more accurate control in processes wherein materials are subject to change due to differences in the rate of travel, the new *Speed-Ratio Tachometer* has just been announced by the Weston Electrical Instrument Corp., 617 Frelinghuysen Avenue, Newark 5, N. J.

The Speed-Ratio Tachometer includes a special speed-ratio indicating instrument as illustrated, which operates in conjunction with two small d-c generators to convert mechanical rotation into measurable electrical quantities.



The generators are simply connected to the input and output drives of the machine, and wired to the ratio indicator. This indicator, or ratio meter, is calibrated in whatever terms are desired; such as % stretch, % shrinkage, % elongation, etc. The indicator can be mounted at any position most convenient for easy reading by the operator; and where required, an additional indicator can be wired into the circuit for use at a distance.

High Intensity Industrial Spot Light

An industrial spot light powerful enough to illuminate clearly welding, cutting, or brazing work when viewed through a No. 10 welder's glass before striking the arc is announced by Westinghouse Electric Corp., Pittsburgh 30, Pa. Particularly applicable for repetitive work, one of these spot lights casts a small-diameter circle of light of from 2500-footcandle brilliance when

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U. S. P. . . . A chemically-pure glycerine meeting all requirements of the U.S. Pharmacopoeia . . . for greaseproof food wrappers, glassine, parchment, photographic papers or any purpose demanding highest quality. Specific gravity, 1.249-25° C./25°C.

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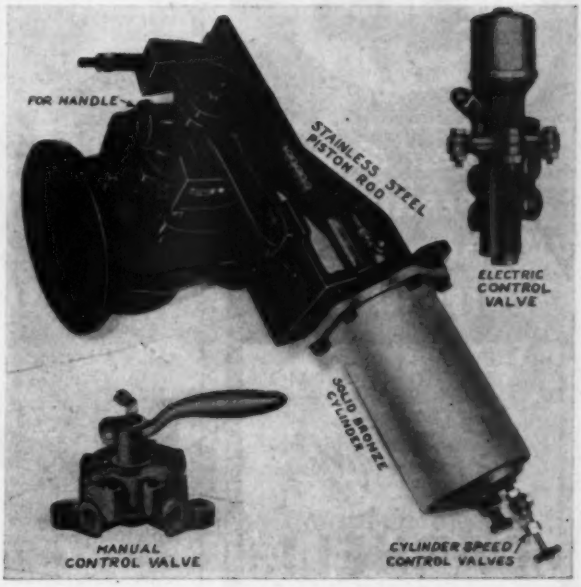
REMOTE CONTROL!



MORE AND MORE MILLS are using DeZurik Easy Operating Plug Valves equipped with hydraulic or air cylinders for remote flow control.

There are many cases where the plant operator's principal duties are at a considerable distance from the valves which he must operate. There are also many cases where opening or closing valves in the improper sequence will cause undesirable mixture of valuable process materials. In all such cases DeZurik Easy Operating Plug Valves equipped with hydraulic or air cylinders will promote efficiency and release the operator's efforts to more productive channels. A single control valve will actuate from one to a large number of cylinder operated valves providing a foolproof arrangement which does not depend upon an operator's skill or memory to know which valves should be open and which closed to produce the desired flow arrangement. Cylinder operating units also provide for easy operation of valves situated in inaccessible locations. A new, low cost indicating system has been developed to show the valve setting at the control point.

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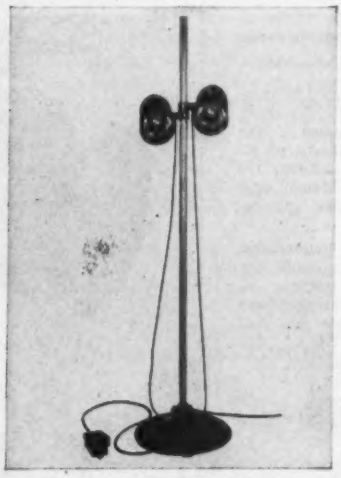
placed 3 ft. from the work to 1000 foot-candles when located 6 ft. away. Two or more lights can be used if desired for any application requiring a small area of very high illumination.

The spot light uses a 6-volt, sealed-beam type of lamp operated from a transformer built into the light housing the complete assembly weighing approximately 5 lb. It can be mounted at any angle on some convenient 1-in. pipe or on its own stand by

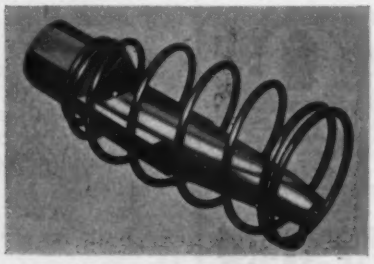


means of a clamp and positive-action spring-loaded swivel joint. The spot lights can be plugged into any service outlet since power requirement for the lamp and accessories is only 30 watts at 115 volts, 60 cycles. Work is made cooler and more comfortable since practically no heat is generated by the spot light because of this extremely low power consumption. Previous lights for this purpose operated at upwards of 300 to 450 watts.

The high intensity industrial spot lights are available as single units complete with built-in transformer and clamp or in a combination of two spot lights and a 6-ft. pipe stand with built-in receptacles, a foot-operated switch, and power cord.

Damage-Proof Washing Nozzle

Since nozzles used in washing are frequently subject to accidental bumping, Spraying Systems Co., 4021 West Lake St., Chicago 24, Ill., has designed a spring guard for its Flatjet nozzles. This guard amply



protects the large deflector face of the nozzle without interfering with the spray. Such protection is highly desirable in this type of nozzle since damage to the face of the deflector can often alter the characteristics of the Flatjet spray. Design of the Flatjet provides a sharp, hard-hitting spray for washing, the characteristic of this spray being established entirely by the tri-curved face of the deflector.

This new Spraying Systems Flatjet nozzle is built with two types of connections (1) with a standard ¾ in. garden hose thread, and (2) with a ½ in. pipe thread. This nozzle is recommended for all types of washing operations such as washing off of floors or machinery. Use of the spring guard assures safety from damage due to accidental bumping of any kind. For easier portable use the nozzle is built of aluminum to keep weight at a minimum. Spring guard is made of phosphor bronze.

Slitter Knife

A recent development of the Ohio Knife Co. of Cincinnati 23, Ohio, is the new *O-Kni-Co-Lok* slitter assembly, which has functioned successfully in paper mills and paper converting plants where it has been used. The O-Kni-Co-Lok eliminates all rivet trouble in knife assembly. Figure 1 shows

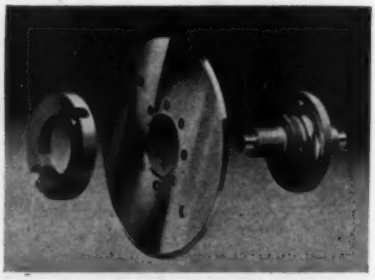


Figure 1

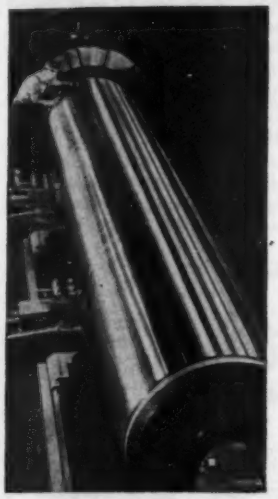
the O-Kni-Co-Lok disassembled. Note the small projecting button which slips into any of the holes designed for all rivet type slitters. This holds knife firmly in place and knife is locked to shaft. The slitter knife, when locked (Figure 2), is then held firmly

Figure 2

without slipping. The nut continues to tighten as the assembly revolves on the bearing shaft which is made of hardened steel. Complete assembly is made by the operator in a few seconds. The knife can be removed in a few seconds by unlocking with spanner wrench as illustrated in Figure 2.

Napkin Folding Machine

A machine designed to handle rolls twice as wide as the conventional napkin stock rolls has been announced by Paper Convert-



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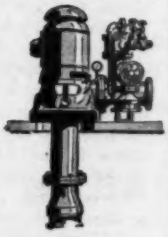
For development of a reliable, permanent water supply, install these deep well pumps with the type of drive most suitable to your application. You have a choice of electric, right angle gear drive, or belted (V- or flat) heads as well as the option of oil or water lubrication. Capacities from 15 to 30,000 g.p.m. are obtained from depths of 1000 feet or more. *Fully described in Peerless Bulletin B-141-1.*

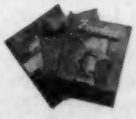
PEERLESS CLOSE-COUPLED TYPE VERTICAL TURBINE PUMPS

For pumping from short settings such as pits, sumps and surface water sources, such as lakes, rivers and ponds, get the full utility and capacity of a deep well pump with a close-coupled Peerless Vertical Turbine Pump. Makes an extremely compact installation. Uses include cooling tower service, boosting, recirculation and dewatering. Capacities: up to 30,000 g.p.m. *Fully described in Bulletin B-159.*

PEERLESS VERTICAL TURBINE APPROVED FIRE PUMPS



For adequate fire protection, the *Underwriters' approved* Peerless Vertical Turbine Fire Pump, with proper fittings, produces from 500 to 2000 g.p.m. against heads from 240 to 285 feet. Built for instant operation. Discharge piping is simplified. Choice of drives and oil or water lubrication. *Fully described in Bulletin B-152.*



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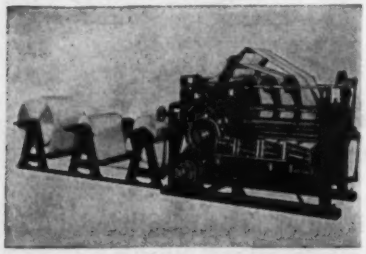
ing Machine Co., Green Bay, Wis. Designated as *Super Six* napkin folding machine, this new equipment is designed to run quarter, eighth, sixth folds and fixture fold—when equipped with proper forming plates. The increase in size of each roll reduces considerably the number of roll changes per day and resultant down time. The production



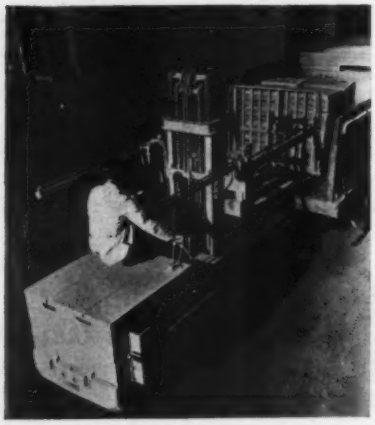
of the Super Six, a three-web machine, is 2000 plus, embossed, quarter-folded napkins per minute. The same machine is also built in a two web machine with production of 1400 plus, embossed, quarter-folded napkins per minute. It is designed low for comfortable handling, and the machine is equipped with slip type clutch for easy starting. The pull rolls are individually adjustable for each web.

Improved Pusher Device

Simplified design, more efficient hydraulic operation and rugged construction with considerable decrease of weight are features of the improved Pusher device for use on Clark fork trucks, announced by the Tructractor Division of Clark Equipment Co., Battle Creek, Mich.

Well established for handling material in cartons and bags, in instances where material must be removed from pallets, the pusher makes it easy to remove the load as a unit rather than piece-by-piece.

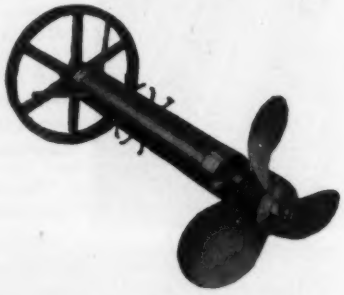
In the newly designed pusher, the pusher rack which travels horizontally to move material off the forks, is connected to two hydraulic cylinders which receive equalized hydraulic pressure through a flow divider. The cylinders are supported by two horizontal slide channels mounted on roller bearings, with the result that the rack travels smoothly and evenly in both directions. Side guard members provide ample protection to slides and cylinders.



Standard and maximum forward travel of the pusher rack is 55½ in. This may be reduced by 1-in. increments to meet special needs. Standard forks may be used for handling palletized unit loads. Where loads are to be removed directly from forks, multiple forks—usually five—are used.

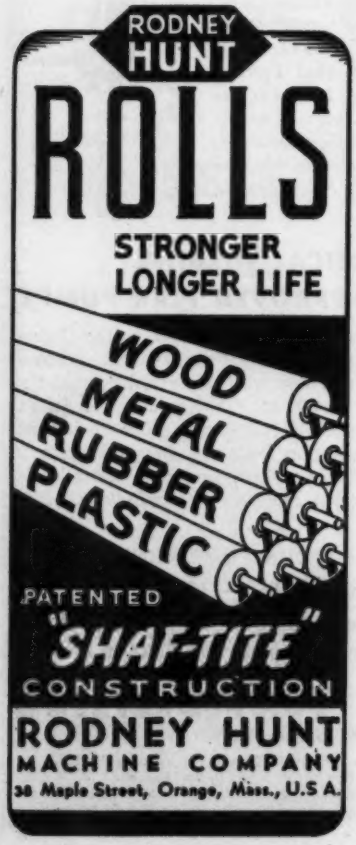
New Agitator

A new propeller-type agitator, designed to agitate materials having consistencies up to 4 per cent is now being manufactured by E. D. Jones & Sons Co., Pittsfield, Mass.



Anchored in the wall of any chest or tank, this cartridge type unit is complete and compact. It is furnished with an electric alarm system which sounds a warning if the water supply, which lubricates the laminated plastic bearings, should fail.

The agitator is built in various propeller sizes to meet particular chest size, 5 to 15 hp. required; all non-corrosive stainless steel and bronze construction.



Fire Causes and Protection of Paper Mills

(Continued from page 480)

not if you would reduce the number of fires which actually start.

Without question, many fires would be eliminated if smoking were not an almost universal habit, for our second biggest cause of fires is smoking and use of matches. While the insurance companies favor the elimination of smoking entirely in industrial plants, we know that is non-practical idealism, and impossible. The next best choice is our preference for controlled smoking in place of surreptitious smoking. Controlled smoking is not a blanket approval for unlimited smoking in any and all areas, not for the provision of smoking stations just anywhere in the mill. Smoking is usually agreed to if conditions permit in isolated office buildings, in non-combustible toilets, or those with concrete floors and wooden sprinklered roofs, in buildings with wet occupancy, etc., but should not be permitted in locker rooms, around paper machines, broke accumulations, storage areas, chip bins or chipping operations. Any proposed smoking stations should be worked out in co-operation with your insurance carriers who are anxious to give you their best advice on elimination of fire causes.

The third greatest cause of fires is from cutting and welding operations, also a subject about which much has been said and written. In cutting and welding operations, it is impossible to eliminate or usually to confine the sparks or globules of glowing metal, and it is ignition from these sparks which cause about 90 per cent of all cutting and welding fires. Possibly the greatest single factor in preventing such fires is careful supervision. In many plants, this is accomplished by use of the permit system. This system regulates all cutting or welding outside of shop areas by requiring the welder to obtain a written permit, signed after personal investigation of the locality in which the welding is to be done, by a responsible party, such as the fire chief, plant engineer, master mechanic, or other designated supervisor. This permit must be in the possession of the welder before a torch is lighted or an arc struck. It is much easier and quicker to remove a machine part and take it to a safe welding or cutting location than to attempt to remove or protect combustion that would be exposed by bringing the torch to the area where the machine is located. If repairs must be made in locations that have contained flammable liquid gases or combustible dust, extreme care should be used to ventilate the area thoroughly and remove all combustible materials. No cutting or welding should be done in combustible buildings unless they are sprinkled and not then during any impairments to the sprinkler system. Extinguishers should be handy for use on possible small fires. In short, careful planning with good supervision where the area is made safe for cutting or welding or the permit denied and other arrangements made for the job will save many fires and interruptions to production.

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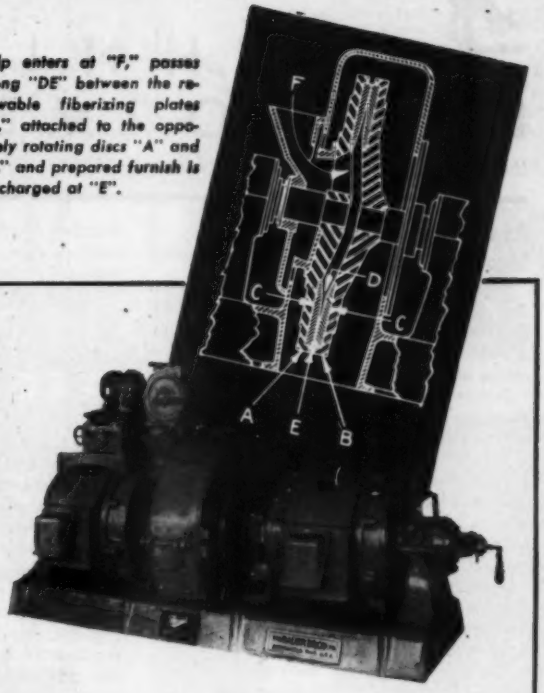

Pulp enters at "F," passes along "DE" between the renewable fiberizing plates "C," attached to the oppositely rotating discs "A" and "B," and prepared furnish is discharged at "E".

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Papermaking Properties of Straw Holocellulose

Fibrous holocellulose was prepared from flax shives and also from wheat, oats, and fiber-flax straw that had been macerated in a buhrstone mill and then delignified by means of (acidified) sodium chlorite. When this pulp was beaten for long time periods, the hand sheets were glassinelike in character. The strength of all these straw pulps developed rather slowly on beating, the highest (but possibly not maximum) burst and breaking lengths being usually obtained after a beating period of about 80-90 minutes. The tear factor decreased with beating, as did the printing opacity, and to a lesser extent the percentage G.E. brightness. All the papers showed relatively low densities in comparison with sheets usually obtained from wood pulps.

Color reversion (*i.e.* decrease in brightness when exposed to ultraviolet light) was quite rapid and was shown to be due almost exclusively to the effects of light and not to the combined effects of heat and light. Heat alone had little effect on the brightness, which seemed to decrease far more rapidly than that commonly found in bleached papers from wood pulps. Because of their high yields (65 to 70 per cent), these holocellulose pulps might well find industrial applications were it not for prohibitive costs. If chlorite could be reduced to about ¼ of its present cost, its use in the paper industry would become of immediate interest. G. A. Adams and A. E. Castagne. *Canadian J. Research* 26 (Section F) 151-159 (March, 1948) (in English).

New Reagent for Groundwood

Sulphanilic acid appears to be an excellent reagent for mechanical pulp with which it gives an intense yellow color. The acid may be used in various forms—as a "pencil" prepared by using adhesives like the dextrins, as a colorless ink, and also in the form of a test paper. The ink is made from 20 g. of sulphanilic acid, 40 g. urea, 40 g. glycerol, and 900 cc. water, and may be applied with a steel pen. The test paper consists of pulp carefully freed from lignin, which has been soaked in a solution of sulphanilic acid and then dried. The author discusses the various applications of the reagent. August Noll, *Das Papier* 1, 57-9 (1947) (In German).

Poplar Woods; Their Suitability for Pulping

Six poplar woods were examined. These were all hybrids, and in some cases were crosses between American and European species that were actually grown in Germany. In general the trees from which the wood was taken were young (8 to 17 years) and the samples used were from the lower portion of the butt, about 1½ feet above the ground. Soil and site conditions are described briefly, and the following typical analyses were made on the various woods: methanol-benzene extractives, lignin, pentosans, holocellulose, residual lignin in the holocellulose, a modified alpha-cellulose (determined by extracting the holocellulose under nitrogen with 10 per cent NaOH) and lignin and pentosans in this cellulose fraction.

The "pure" cellulose (depending on the sample used) varied from 40 to nearly 50 per cent. Five of the poplars were pulped by the sulphate process, using identical pulping schedules in each case. Pulp yields, pulp components, and strength properties were then determined. The wood of *Populus monilifera* gave an excellent pulp in 56.3 per cent yield, and *Populus Bachelierii* was in this same class (giving nearly 58 per cent easy bleaching pulp). The results for another species, *P. generosa*, were not too consistent because two different wood samples gave very divergent results. The various results are fully tabulated and discussed. In all cases the strength tests on the popular pulps far exceeded those of beechwood kraft pulps. Georg. Jayme. *Das Papier* 1, 182-90 (1947) (In German).

Sugars from the Sulphite Cook

The author shows that there is no useful purpose in prehydrolyzing wood that is later to be used in the production of sulphite pulp for rayon manufacture. Prehydrolysis improves neither pulp quality nor the yields of sugars in the waste liquor. Experiments were carried out in a digester (capacity 216 cu. meters) which was provided both with direct and with indirect heating facilities, and which was equipped with a circulating device by means of which the cooking liquor could be withdrawn from the upper part and pumped through a preheater to be reintroduced into the lower portion of the digester.

In prehydrolysis experiments 5 per cent sulphur dioxide was introduced at 80 deg., followed by 1 per cent ammonium hydroxide based on the dry weight of the wood, and the digester temperature was then raised to 115-120 deg. in the case of spruce wood, and 123 deg. in the case of beech. Graphs are given to show the cooking schedules, sugar yields and sulphur dioxide consumption. The prehydrolysis was followed by a careful draining of the waste liquor and washing of the pulp residues. Techniques used in liquor recovery are fully discussed, but the author does not state the exact methods for determining the total sugars in the liquors.

After this prehydrolysis, the wood was cooked by the sulphite process under definite conditions. In a series of control experiments, the prehydrolysis was omitted, and the chips were given only a single stage sulphite digestion. Tabulated data indicate that although the alpha cellulose content of the prehydrolyzed and unhydrolyzed bleached pulps was nearly the same, the unbleached sulphite pulps resulting from the prehydrolysis were no lower in pentosans and were far less uniform than was the unbleached non-hydrolyzed sulphite pulp. The prehydrolysis-sulphite digestion yielded 20 per cent sugars from spruce and 26 per cent from beech, whereas the single stage sulphite digestion (without hydrolysis) yielded respectively 24 and 30 per cent total sugars (thus approaching much more nearly the calculated values of 25.9 and 31.7 per cent). Other disadvantages of the prehydrolysis are increased time and steam consumption, and the resulting higher costs.

It was previously claimed that a prehydrolysis would give a cleaner sugar solution, with less impurities. This is discounted by the author, who claims that about 75 per cent of the lignin originally present in the wood was removed during the prehydrolysis. The author gives data on the composition of the pulps obtained, and emphasizes the fact that by proper control of the sulphite digestion, destruction of the sugars can be largely prevented. Rudolf Schepp. *Das Papier* 1, 140-5 (1947) (In German).

Changes in Properties of Mechanically Regenerated Paper

Before the appearance of the present communication, only one comprehensive study had been made on the changes in paper properties resulting from the mechanical regeneration of waste paper. This was the work of Brax and Pfaler, in the *Finnish Timber J.* 1933, 562-569. The present author used papers made from unbleached kraft stock, and added no size or loading materials. The conditions of disintegration and of sheet formation were kept as nearly identical as possible, and the techniques are described in full detail. Fresh water was invariably used.

The author studied the effects of beating the original stock (I) on the properties of the regenerated stock (II), which was always freer than (I), and the sheets from which were bulkier and more sorbant. The folding endurance, breaking length, and tear through of sheets from (II) were frequently below those of (I). However, in those cases in which (II) consisted of very slow stock, the differences between (I) and (II) were no longer so marked. Changes from (I) to (II) were accompanied by the removal of finestuff (the smallest particles of the degraded fibers) during sheet formation and such losses proved greatest in the case of the slowest stocks.

When relatively small amounts of this finestuff were added to (II), the original properties of (I) could be regained in large measure, even when the stock had been worked over a number of times. The strength properties of (II) sheets increased with an increase in sheet density caused by pressing. It was shown that wet pressing played a more important role than did dry pressing. Pressing alone, however, never caused a complete regain of strength, due presumably to the losses of finestuff in forming (II). The greater the initial density of (I), the larger were the differences in properties between (I) and (II). The author gives seven graphs. Walter Brecht, (Tech. Hochschule, Darmstadt, Germany) *Das Papier 1*, 16-21; 60-3 (1947) (in German).

The routine use of this Indicator can save time and money in any pressroom by eliminating a common cause of "off register" and other pressroom troubles. The Cambridge Printer's Moisture Indicator is accurate and rugged; simple and convenient to use: First, an index pointer is set at the humidity of the pressroom air as shown on the Indicator's scale. Then the perforated metal blade which encloses the measuring element is inserted between the stacked or hung sheets; in less than a minute, the moisture content of the paper is shown. With this information, the pressman can tell at once whether the paper is ready to run.

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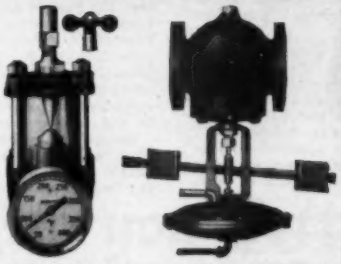

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New Catalogues and Publications

Atlantic Powdered Metals, Inc., 38 Park Row, New York 7, N. Y.—An attractive brochure describing the history and development of custom-made bronze powders has been prepared by this company. A series of photographs show the various steps in preparing the powders and a chart lists the special qualities which make the powders useful to different industries.

Brooks Rotameter Company, Box B-7548, Lansdale, Pa.—Now available from this company is Bulletin No. 2 about its electronic flow recording and flow recording-controlling Rotameter. Diagrams show the principle of operation, a typical installation, an automatic ratio control diagram, and dimensions of inductronic Rotameters.

Buckner Process Company, Department 102, 544 Main St., Worcester 8, Mass.—A new 6-page circular describes the functions and scope of "Lion Paw" brand conveyor belting, transmission belting, and safety matting. Numerous line drawings depict the versatility and economy of these products.

Elliott Company, Ridgway Division, Jeannette, Pa.—A 4-page bulletin PB 7000-2 has been issued which describes the company's new Fabri-steel, squirrel-cage induction motors. Nineteen illustrations and a line drawing show distinctive construction details. It is available upon request to Technical Data Department.

Eutectic Welding Alloys Corporation, 40 Worth St., New York, N. Y.—Now available is the latest edition of "Here Is Your Information," a 4-page bulletin on the outstanding welding rods for use in every shop. The bulletin has been scientifically arranged according to metals and lists specific applications, tensile strengths, bonding temperatures, sizes and outstanding characteristics of each rod.

Fischer & Porter Company, Dept. 1F-L, Hatboro, Pa.—A new 4-page engineering bulletin gives detailed recommendations on construction materials for almost 400 different corrosive liquids and gases. The bulletin was designed for selecting materials to be used in the company's Flowrator Instruments, but its selection of information makes it useful with machinery quite different than flowmeters.

The B. F. Goodrich Company, Akron, Ohio—Two pamphlets are available from this company. One is a 6-page catalogue section on the fittings which it supplies for the diversified lines of hose it manufactures. Featured in the section are recommendations for attaching couplings to hose, and a table showing the various couplings recommended for different types of hose. The second piece of literature is a broadside on the Speed Selector, which permits stepless, infinite ratio changes in rapid succession by a new development in planetary motion.

Hercules Powder Company, Wilmington, Del.—Approximately 100 chemicals produced by this company are described in a Hercules products book. The chemicals are classified by family groups, and described as to chemical make-up, uses and potential applications.

The International Nickel Company, 67 Wall St., New York 5, N. Y.—Various aspects of galvanic corrosion are discussed in a new booklet which was prepared under the supervision of the company's corrosion engineering section. Factors influencing galvanic corrosion and ways of minimizing galvanic effects are included in the 10-page booklet.

Nagle Industrial Pumps, Chicago Heights, Ill.—A new 36-page bulletin demonstrates the time-saving features of Nagle pumps. The two horizontal shaft and three vertical shaft types of Nagle pumps are illustrated and fully described. Ask for Bulletin No. 4711.

The Patterson Foundry & Machine Company, East Liverpool, Ohio—A 40-page catalogue, No. 482, is available which illustrates and describes the company's complete selection of batch type pebble and ball mills and continuous feed and discharge tube mills, its classifying devices of all types, and its grinding plants. Also available upon request is a new booklet describing the function and importance of pilot plants in the chemical-process industries. The 8-page booklet fully discusses the construction and use of the Patterson synthesizing process pilot plant.

The Permutit Company, 330 West 42nd St., New York 18, N. Y.—Two new 12-page bulletins have been released which cover the Permutit Zeo-Karb Water Softeners and the Permutit Spauling Precipitators. Both bulletins illustrate the equipment with large cutaway photographs and pictures of installations in various industries.

Powermatic Ventilator Company, 4019 Prospect Ave., Cleveland 3, Ohio—The 1948 catalogue on the Iron Lung for industrial buildings has been released by this company. Twenty pages of large photographs show its many features and applications. There also are additional pages of dimensions, specifications, and a partial list of users.

The Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland 10, Ohio—The new 8-page Reliance bulletin No. 311 covers the latest developments in all electric, adjustable speed (V*S) drives for a-c circuits. Nine specific applications of the drive in as many different industries are illustrated. Included are applications for the paper industry, also paper processing. Also supplied is data on constant torque and constant horsepower available in units from 1 to 200 hp. in size.

Robins Conveyors Division of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.—"Floatex Foundry Shakeouts and other Hewitt-Robins Products for Foundries" is the title of Bulletin No. 124-B. Many innovations in the foundry industry are covered, including the latest move toward complete mechanization of operations by conveyorized handling of flasks to and casting from the shakeout.

Roots-Connersville Blower Corporation, 900 West Mount St., Connersville, Ind.—The company's entire line of products is illustrated and briefly described in the new 4-page Bulletin G-82. Applications of R-C products are listed according to usage rather than industries. The text matter also covers the capacity and pressure ranges in both standard and special units.

Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.—Abrasion resisting steel plates and sheets are described in one of the new bulletins available from this company. Typical applications, performance records, and heat treatment and fabrication are covered. The second bulletin describes Ry-ax, a heat-treated carbon-manganese hot rolled bar steel, by listing mechanical properties, hardness readings, and machinability rating.

Schutte and Koerting Company, 12th and Thompson Sts., Philadelphia 22, Pa.—A new 8-page bulletin, No. 5-B, pictures the company's Low-Level Eductor Condensers which operate on the jet principle. An easy-to-read table gives maximum water consumption, steam capacities, connection sizes, dimensions and weights for the numerous sizes available. Also available upon request is a four-color diagrammatic layout of a high pressure power plant, illustrating the application of numerous types of power plant equipment.

Titeflex, Inc., 500 Freylinghuysen Ave., Newark 5, N. J.—In addition to Titeflex brass tubing, a new 24-page catalogue describes the company's new bronze tubing for nominal steam pressure applications and corrosion resistance, and inconel tubing for extremely high temperatures. Also covered in the new catalogue are Titeflex bendable type, high frequency conductors, and vibration eliminators.

Warren Steam Pump Company, Inc., Warren, Mass.—A comprehensive 6-page bulletin has been prepared by the company in connection with its special line of Machine and Jordan Chest Centrifugal Pumps. A sectional view, approximate dimensions, and partial list of installations are shown. A chart has been reproduced which was made in a large paper plant and shows a 24-hour record of stock level in the regulating box. Request Bulletin No. 243.

Books

Chemicals Used In the Paper Industry—This book, which is put out by The American Pulp and Paper Mill Superintendents Association, lists 357 common name chemicals and nearly 400 trade name chemicals, and tells the purposes for which they are used. It also gives the addresses of approximately 800 suppliers. Although this book is not designed to give complete information concerning the uses of each chemical, it does aim to list the principal chemicals used to obtain desired results. It is expected that mill men, such as paper mill superintendents, pulp mill superintendents, beater room foremen, purchasing agents, heads of chemical laboratories, and heads of converting departments, will find this book most helpful. The book is well arranged for easy reference. It is spiral bound with flexible fabrikoid cover stamped with gold. The price is $2.50 and copies may be obtained from H. S. Cobb Printing Co., Westbrook, Maine.

Modern Paper Making (Third Edition)—This book by Robert Henderson Clapperton and William Henderson, is largely a reprinting of the second edition that was brought out in 1941. It contains approximately 400 pages, and opens with a discussion of the fibrous materials used in the manufacture of paper. This is followed by a treatment of such subjects as: paper from rags, treatment of rags, boilers, bleaching, preparation of bleaching solution, gas bleaching—reduction to halfstuff, wood pulp, esparto grass, straw—beating—repulping broke—resin sizing, starch, silicate of soda—alum, loadings, and the use of dyes.

The next five chapters are devoted to papermaking machines. There is a chapter on the manufacture of newsprint, as well as a chapter on hand-made paper. Other chapters cover gelatine sizing, hand sizing, tub sizing, air drying—damping, supercalendar, plate-glazing, cutting, sorting and finishing, paper conditioning, testing of paper-durability, and storage of paper, water supply, and soda recovery. The presentation includes 157 illustrations.

The book is published by Basil Blackwell & Mott, Ltd., 49 Broad St., Oxford, England; the price, 30/— a copy.

Nomography—By Alexander S. Levens (Reviewed by D. S. Davis). Professor Levens' wide experience as engineer and teacher has prompted him to employ the geometric approach in his clear and well-written text on the construction of alignment charts, although he has appended a chapter that deals competently with the determinant method. The book, which shows the strong but beneficial influence of Lipka's "Graphical and Mechanical Computation" (John Wiley and Sons, 1921), is well organized and consistent in nomenclature. It employs type forms and practical (if not always original) problems in an adequate manner and sets the student a good example with well-designed charts. There are 176 pages.

Mathematical proofs are presented in sufficient but not burdensome detail, effective and actual moduli are plainly distinguished and the problems reflect all fields of engineering, though some are not as difficult as those that face nomographers in the paper industry. Most engineers would appreciate a more extensive treatment of the recurrent variable type of equation which usually requires a curved axis and will not find the chapter on practical shortcuts to be of exceptional value.

The indexing and bibliography are satisfactory, the paper is heavy and freedom from typographical errors characterizes a practical engineering text that is a real credit to author and publisher. Published by John Wiley and Sons, Inc., New York City. Price, $3.00.

The Paper Year Book—The sixth annual edition of this valuable and informative encyclopedia of paper and paper products has just been published. Its 574 pages are divided into eight major sections, including Paper and Paper Products Data, Paper Markets, Charts and Tables for Printing Papers and Wrapping Papers, Practical Testing Methods and Paper Making. There is also an alphabetical listing of manufacturers' addresses. Detailed information is given on more than 1,000 different paper items, illustrated with over 700 photographs and drawings and 100 charts and tables.

The book is attractively bound in coral leatherette embossed in black and silver. The price is $8.00, direct from the publishers, Davidson Publishing Company, 22 East Huron Street, Chicago 11.

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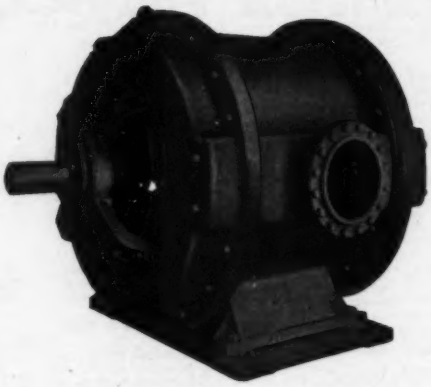

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Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.	
Blue Overalls	8.75	to 9.00
Corduroy, Men's	6.50	to 7.00
Corduroy, Ladies'	6.50	to 7.00
Washables, No. 1	5.50	to 5.75
Percales	7.50	to 8.00
Light Prints, No. 1	7.50	to 8.00
Khaki Cuttings—		
Bleachable	7.25	to 7.50
Unbleachable	6.50	to 6.75
New White Canvas	12.00	to 13.00
New Mixed Blacks	5.50	to 6.00
Canton Flannels, Bleached	11.00	to 11.50
Shirt Cuttings—		
New White No. 1	11.50	to 12.00
White Shrunk	10.50	to 11.00
Silesias No. 1	8.75	to 9.25
New Unbleached	12.00	to 12.50
Fancy	6.75	to 7.00
Linen Cuttings—		
American	8.50	to 9.00
White	14.50	to 15.50
Grey	13.50	to 14.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.	
Roofing—		
No. 1	1.75	to 1.80
No. 2	1.65	to 1.70
No. 3 and No. 4	1.45	to 1.55
Twos and Blues—		
Repacked	3.25	to 3.50
Thirds and Blues—		
Repacked	3.00	to 3.25
Miscellaneous	2.50	to 2.75
Whites, No. 1—		
Repacked	4.75	to 5.00
Miscellaneous	4.00	to 4.25
White, No. 2—		
Repacked	3.75	to 4.00
Miscellaneous	3.00	to 3.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.	
New Dark Cuttings	Nominal	
New Mixed Cuttings		
New Light Silesias		
Light Flannelettes		
Unbleached Cuttings		
New White Cuttings		
New Light Oxfords		
New Light Prints		

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.	
No. 1 White Linens	Nominal	
No. 2 White Linens		
No. 3 White Linens		
No. 4 White Linens		
No. 1 White Cottons		
No. 2 White Cottons		
No. 3 White Cottons		
No. 4 White Cottons		
Extra Light Prints		
Ord. Light Prints		
Med. Light Prints		
Dutch Blue Cottons		
French Blue Cottons		
French Blue Linens		
Checks and Blues		
Linsey Garments		
Dark Cottons		
Old Shappories		

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.	
Gunny No. 1—		
Foreign	Nominal	
Domestic	7.00 to	7.25
Wool Tares—		
Light	7.25 to	7.50
Heavy	7.75 to	8.00
No. 1 Scrap Bagging	6.25 to	6.50
Manila Rope—		
No. 1 large	6.50 to	6.75
No. 1 small	5.50 to	5.75
Sisal Rope—		
No. 1 large	6.00 to	6.50
No. 1 small	5.50 to	6.00
New Burlap Cuttings	7.50 to	8.00
Jute Threads—		
Foreign (Nom.)	6.50 to	7.00
Domestic	6.00 to	6.50
Strings—		
No. 1 sisal	5.50 to	5.75
No. 2 sisal	5.00 to	5.25
Soft jute	4.25 to	4.50
Mixed	2.50 to	2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	140.00—
Hard White, No. 1	120.00—
Soft White No. 1	100.00—
Soft White, One-cut	120.00—
Soft White, Misc.	90.00—
Fly Leaf, No. 1	55.00—
Fly Leaf, Woody, No. 1	40.00—
No. 2 Mixed Col. Woody	30.00—
Flat Stock—	
No. 1 Heavy Books and Magazines	25.00 to 27.00
Mixed Books	20.00 to 21.00
Ledger Stock—	
No. 1 white	80.00 to 85.00
No. 1 Mixed (Colored)	60.00 to 65.00
Manilas—	
New Env. Cuttings	95.00 to 100.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	90.00 to 95.00
Colored Manila Tab Cards	65.00 to 70.00
Kraft—	
New Envelope Cuttings	100.00 to 110.00
Tripled Sorted No. 1 100%	70.00 to 75.00
New 100% Cor. Cuts	65.00 to 70.00
No. 1 Old Assorted	45.00 to 50.00
News—	
White Blank	85.00 to 90.00
Overissue	16.00 to 17.00
No. 1 Baled	12.00 to 13.00
Old Corrugated Containers	23.00 to 25.00
New Corrugated Cuts	37.00 to 39.00
Mill Wrappers	20.00 to 21.00
Box Board Chips	9.00 to 10.00
No. 1 Mixed Paper	9.00 to 10.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—		
Lump, cwt.	4.25—	
Ground, cwt.	4.00—	
Powdered, cwt.	4.40—	
Blanc Fixe—		
Pulp, bulk, ton	75.00—	
Dry, barrels, pound	82.50—	
Bleaching Powder—		
Drums, cwt.	3.00 to	3.50
Casein (Domestic Standard)		
20-30 mesh (bags), lb.		
80-100 mesh (bags), lb.	31.00 to	32.00
Argentine, lb.	28.00 to	29.00
China Clay—		
Domestic Filler Bulk (mine) ton	10.00 to	15.00
Domestic Coating Bulk (mine) ton	15.00 to	25.00
Imported (ship side) Bulk (lump) ton	22.00 to	30.00
Chlorine—		
Tank cars (wks) cwt.	2.25 to	2.50
Gelatine (silicin), lb.	1.60 to	1.65
Glyc. (C.P.) drums, lb.	.39½ to	.40
Litharge, powd., bbl., lb.	.19¼ to	.20¼
Rosin (Gum)—		
New York, per 100 lbs.		
E	7.80—	
F	7.80—	
G	8.00—	
WW	8.25—	
Rosin (Wood), carlots	6.50—	
Salt Cake—		
Dom. bulk (wks) ton	20.00 to	25.00
Imp. bulks on dock—(Atl. ports) ton (Nom.)	25.00 to	———
Soda Ash—		
Bulk (works), cwt.	1.10 to	1.20
Paper Bags, cwt.	1.25 to	1.35
Barrels, cwt.	1.35 to	1.60
Soda (Caustic)—		
Solid drums, cwt.	2.65 to	2.85
Ground and flake, drums, cwt.	3.00 to	3.25
Sodium Silicate—		
60 deg., 55 gal. drums, (works) cwt.	1.65 to	2.05
40 deg., 35 gal. drums, (works), cwt.	.80 to	1.45
Starch—		
Pearl, 140 lb. bags, cwt.	6.96—	
Pearl, barrels, cwt.	6.96—	
Paper, (Sp.) bags, cw.	6.96—	
Powdered, barrels, cwt.	7.07—	
Sulphur (Crude)		
(Mine) bulk, long ton	16.00 to	18.00
Talc—		
Dom. 100 lb. bags (mine) ton	20.00 to	28.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	.18 to	.18½
Calcium Pig, bbls., lb.	.18 to	.18½
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swedish	185.00 to 195.00
Bleached sulphite, Finnish	187.50—
Bleached sulphite, dom.	126.00 to 135.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	155.00 to 157.00
Unbleached sulphite, Fin.	155.00 to 157.00
Unbleached sulphite, dom.	125.00 to 130.00
Unbleached kraft, Swedish	147.50—
Unbleached kraft, Finn.	147.50—
Unbleached kraft, northern	125.00 to 135.00
Unbleached kraft, southern	110.00 to 125.00
Bleached sulphate, Swedish	185.00 to 190.00
Bleached soda, domestic	130.00 to 135.00
Sulphite screenings, dom.	60.00 to 70.00
Sulphate screenings, dom.	60.00 to 70.00
Groundwood, domestic and Canadian	80.00 to 85.00

PAPER

f.o.b. New York City

Boards—	per ton	
Binders	94.00—	
Chip	90.00—	
Chip, tube and can	95.00—	
Chip, full blending	97.50—	
Chip, sgl. mls. lined	95.00—	
Coated, white patent .016	120.00—	
.020 and heavier	110.00—	
Kraft liner	79.00—	
Filled News	90.00—	
Container	90.00—	

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.25—
B Grade E. F.	13.30—
C Grade E. F.	—
D Grade E. F.	—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	19.55—
No. 2 Glossy	18.30—
No. 3 Glossy	17.60—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—

(In Ton Lots)	per cwt.
Extra 100% Rag	48.70—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	23.25—
25% Rag	25.10—

Rag Content Ledger—

(In Ton Lots)	per cwt
Extra 100% Rag	48.70—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	23.25—
25% Rag	25.10—

Sulphite Bond—

	per cwt.
Air dry, watermarked	—
No. 1 watermarked	18.50—
No. 2 watermarked	17.55—
No. 4 watermarked	16.85—

Sulphite Ledger—

	per cwt. Zone 1
No. 1 watermarked	18.35—
No. 2 watermarked	18.05—
No. 4 watermarked	17.35—

Glassine (f.o.b. mill)—

	per cwt
Embossed (25 lbs. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—

	per ton
Rolls, Standard (Contract)	96.00—
Rolls (Spot)	(Nominal)
Sheets	115.00—

Tissues (Carlots)—

	per ream
White No. 1	1.85—
White No. 2	1.75—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.85—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs	8.50 to 10.00
Toilet, Unbleached (M. shts.) per cs	8.50 to 10.00

Towels—

	per case
Bleached	4.75—
Unbleached	4.00—

Wrappings (Kraft)—

	per cwt.
Super-Standard	9.00 to—
No. 1 Wrapping	7.25 to 8.00
Standard Wrapping	6.50 to 7.00
Standard Bag	6.50 to 7.00
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)—(Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only (10,000 lbs.)	—
Drug wrapp., 35 lb.	—

Unbleached Papers—

Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—

Envp. Mls., Sub. 16-40 (No. 1)	—
Envp. Mls., Sub. 16-28 (No. 2)	—
Envp. Mls. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mls. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade R20 lb.	—
Grade A-22 lb.	—

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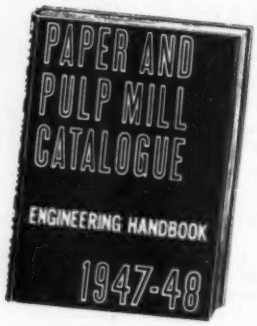

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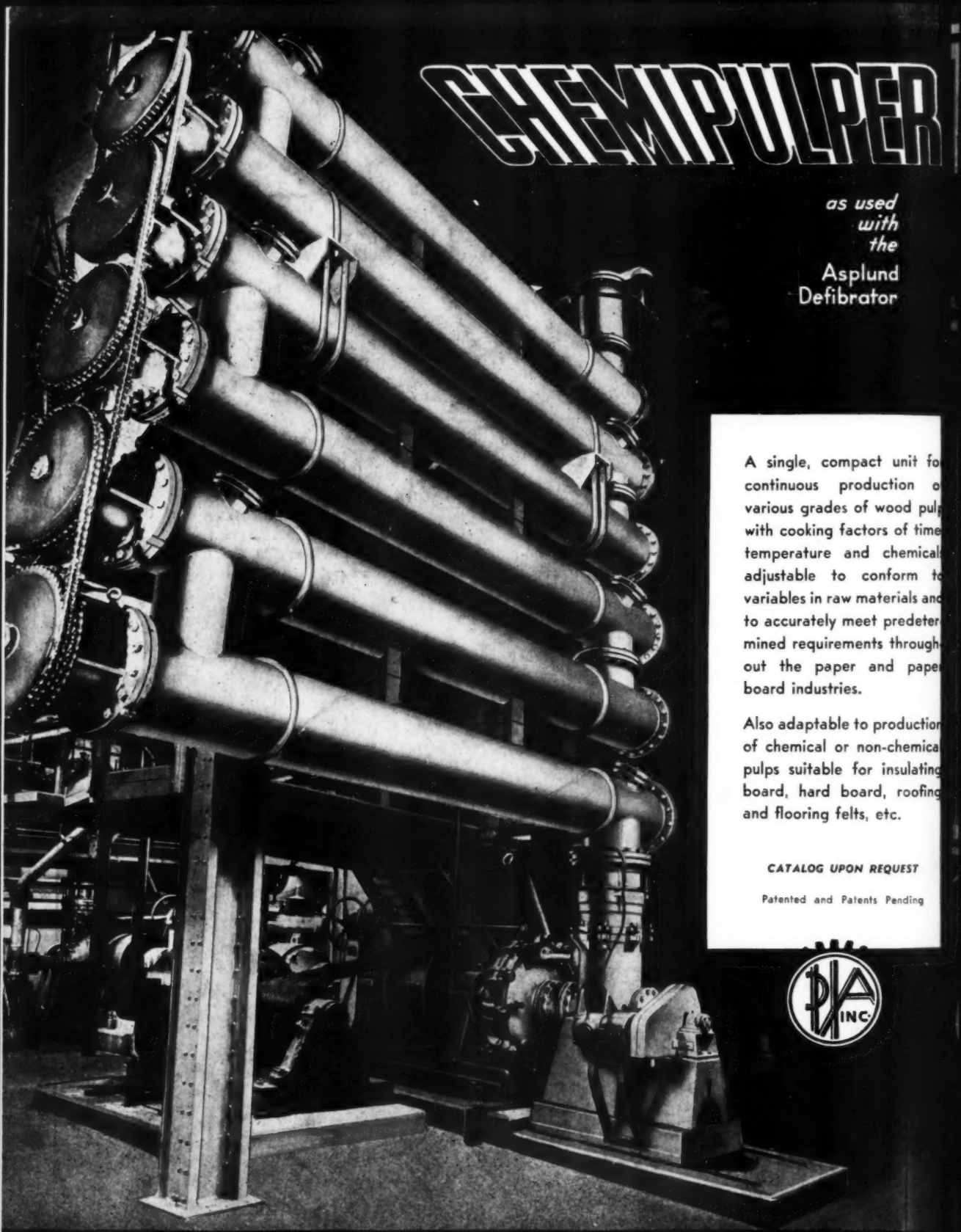

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